

References

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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



Appendices

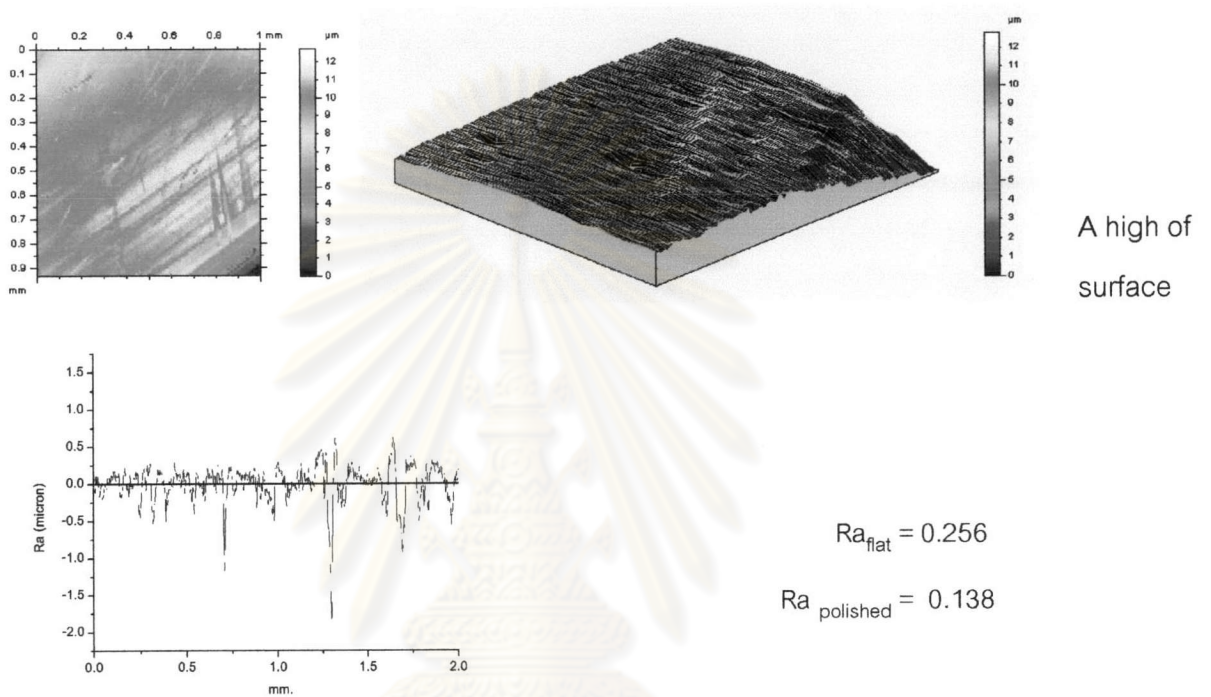
ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Appendix A

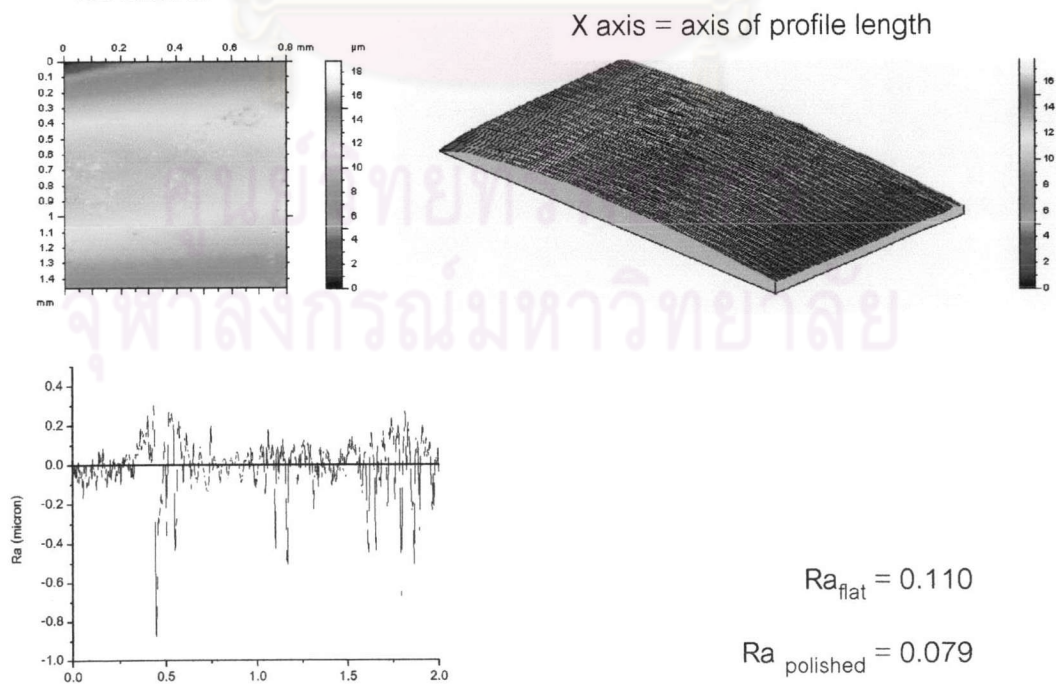
The result of surface roughness induced was recorded as average roughness (Ra in μm) with a profilometer (Taylor Hobson Precision, Talyscan 150).

1. Dentin and enamel surfaces polished with Nupro prophylaxis paste.

1.1 Dentin

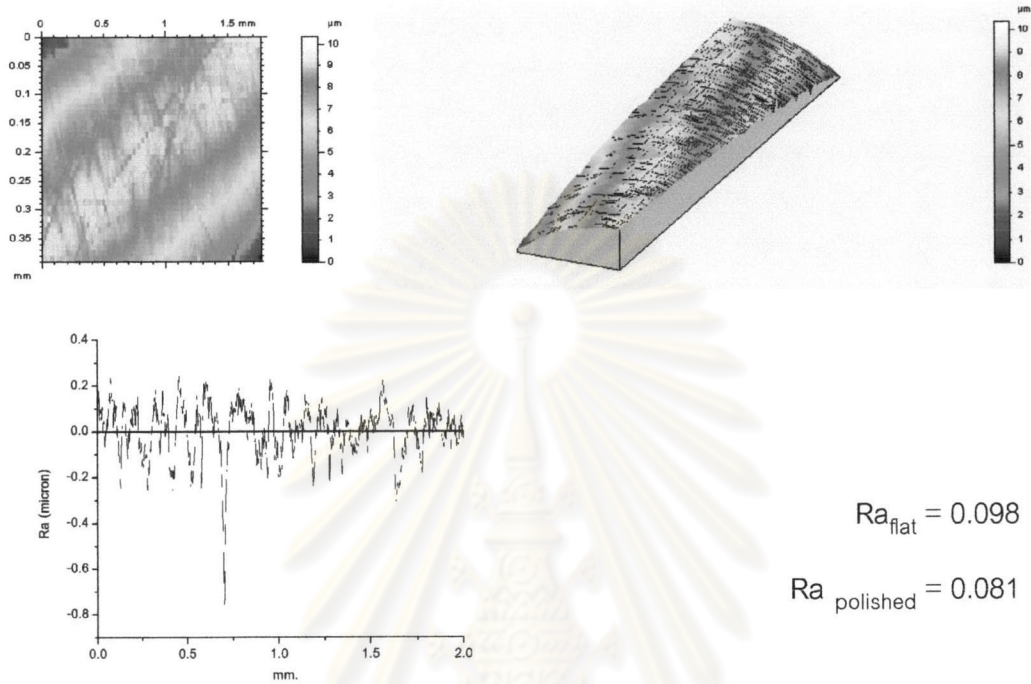


1.2 Enamel

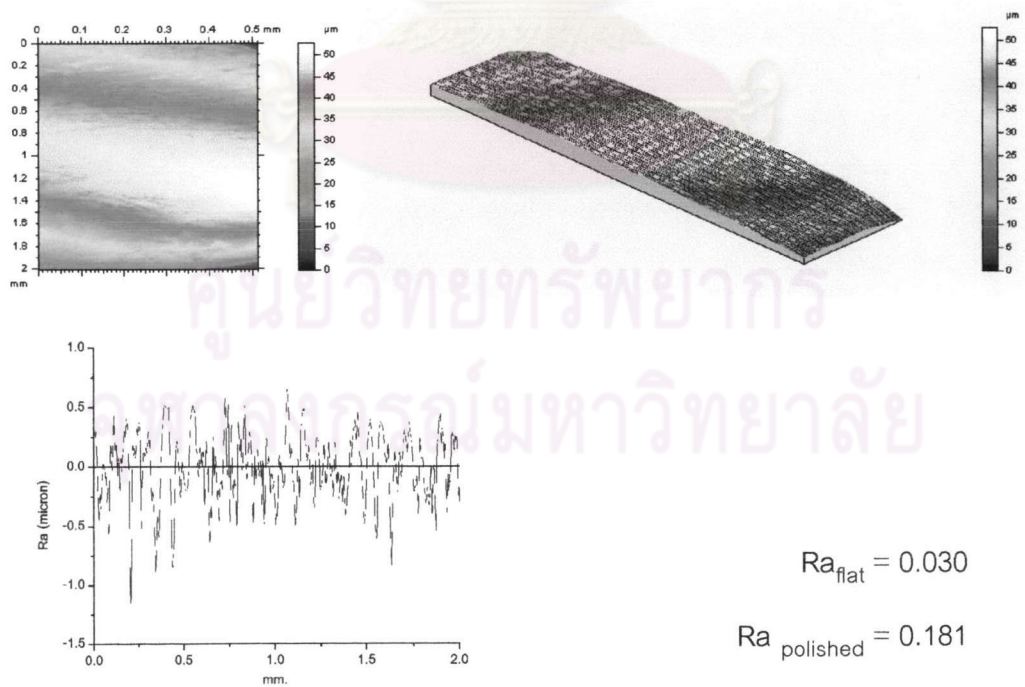


2. Dentin and enamel surfaces polished with silica -16 μm

2.1 Dentin

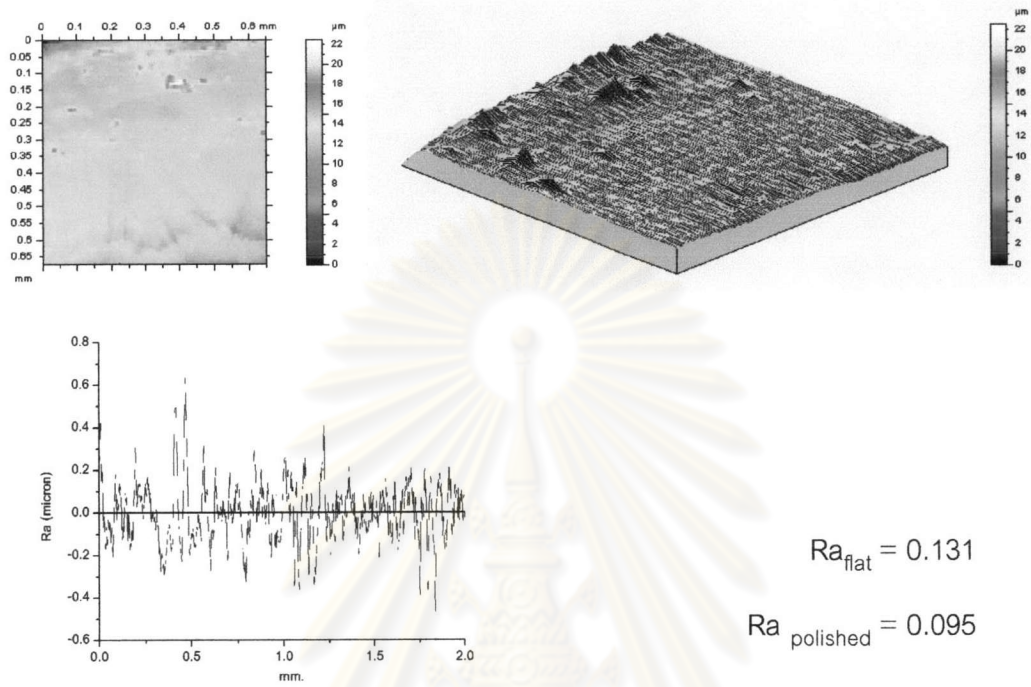


2.2 Enamel

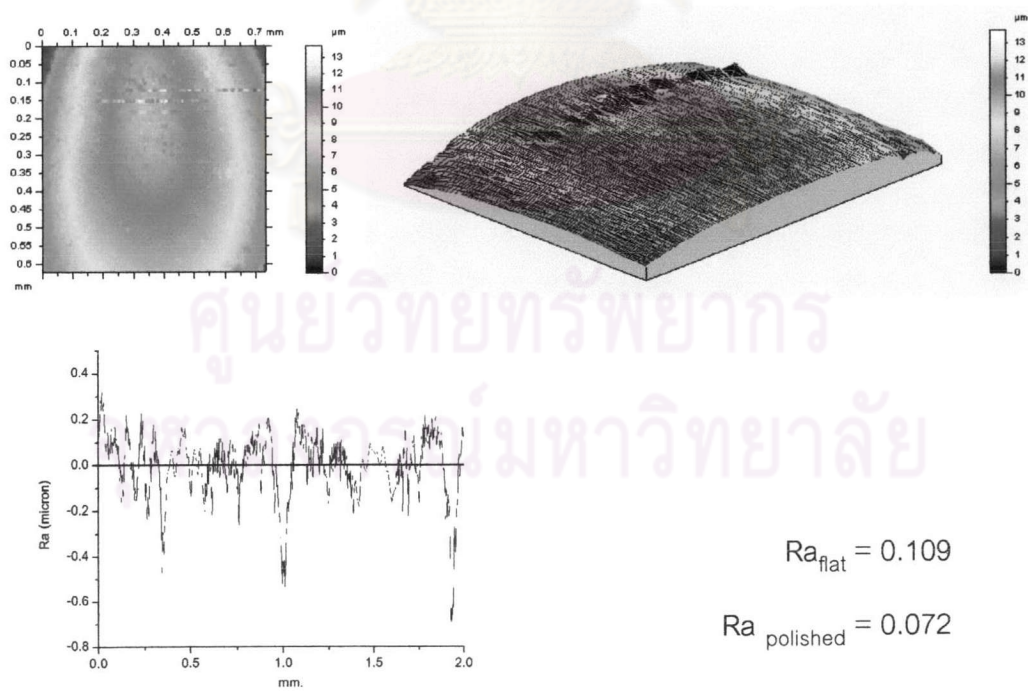


3. Dentin and enamel surfaces polished with perlite -16 μm

3.1 Dentin

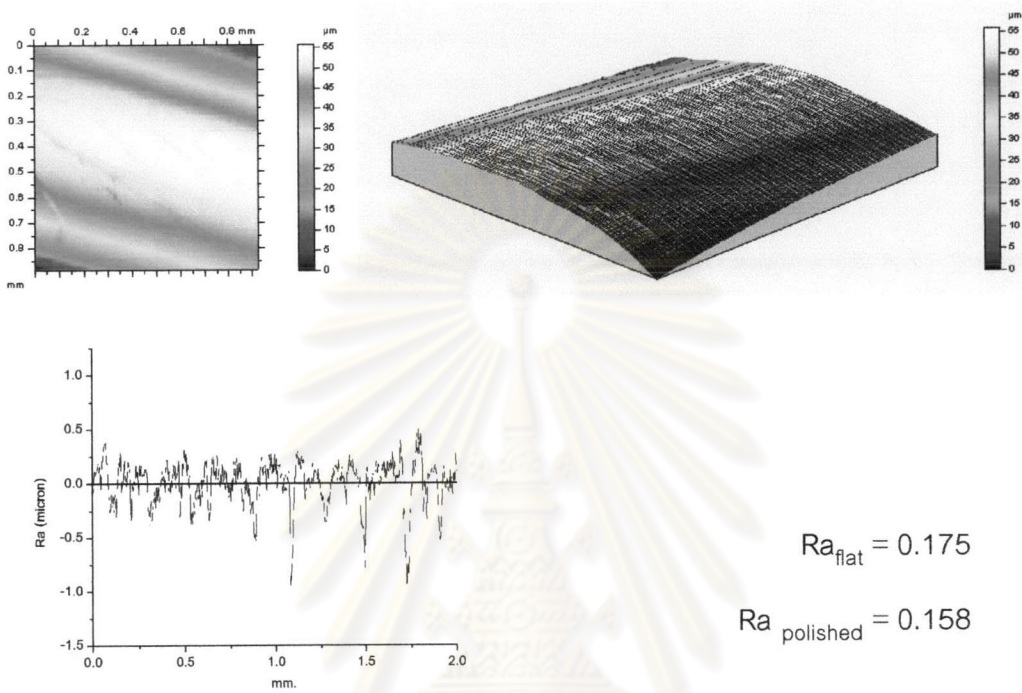


3.2 Enamel

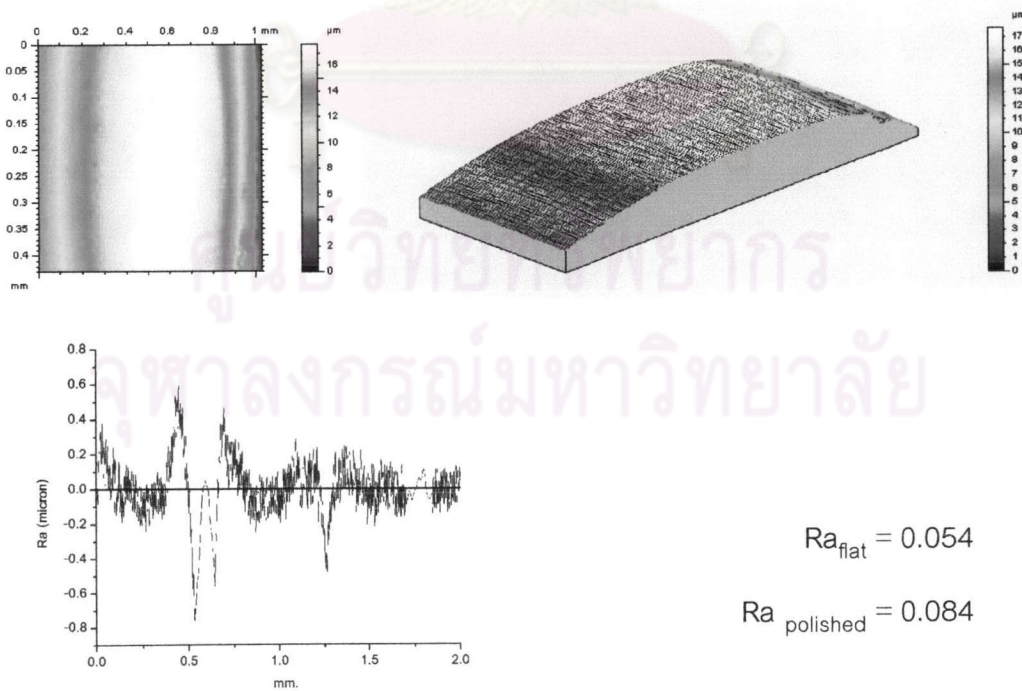


4. Dentin and enamel surfaces polished with pumice -16 μm

4.1 Dentin



4.2 Enamel



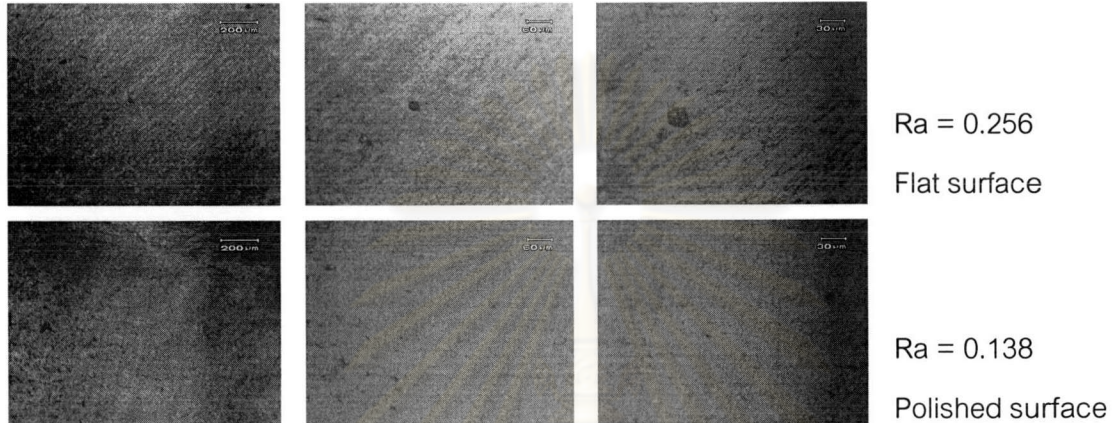
Appendix B

The OM of the some dentin and enamel in 5X, 10X, 20X

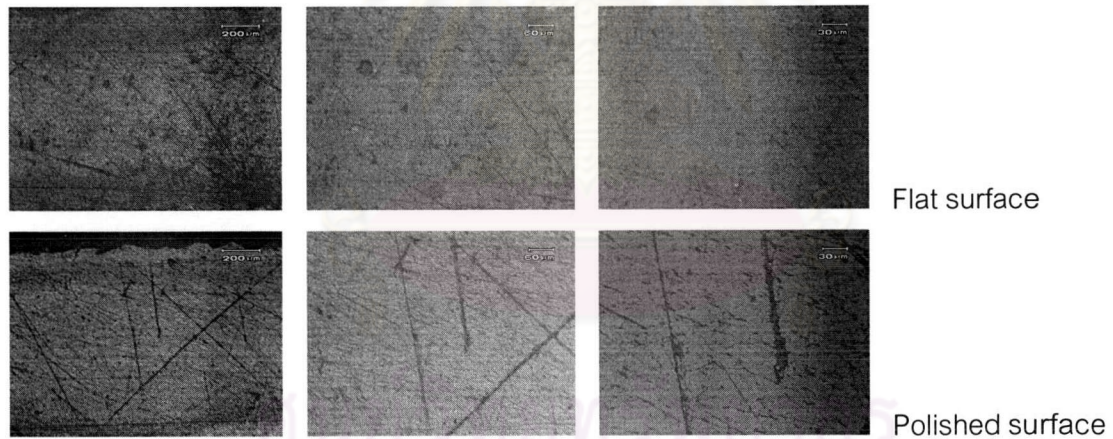
1. Dentin and enamel surface of flat surface and polished surface with Nupro.

1.1 Dentin

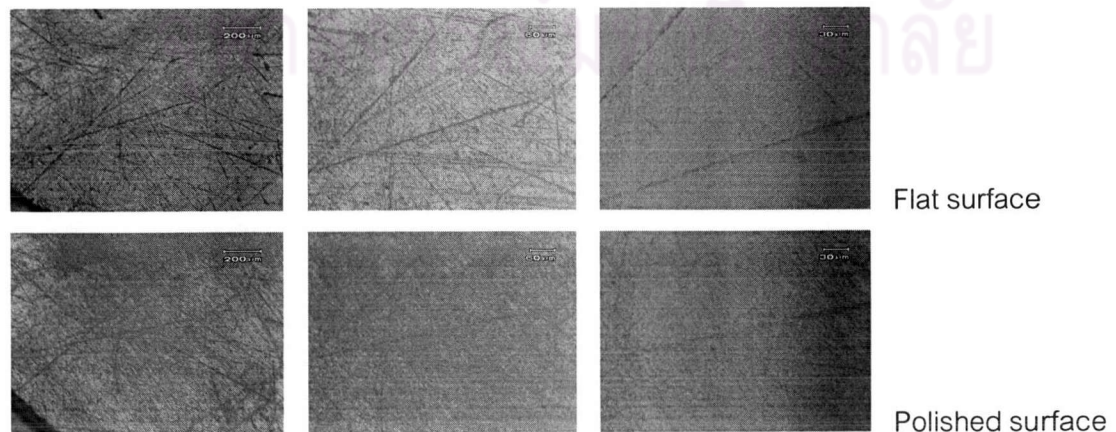
1.1.1 Dentin surface was polished 30 second.



1.1.2 Dentin surface was polished 60 second.



1.1.3 Dentin surface was polished 90 second.



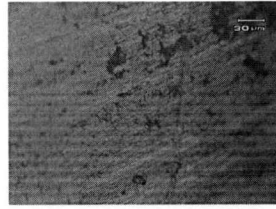
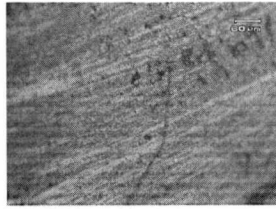
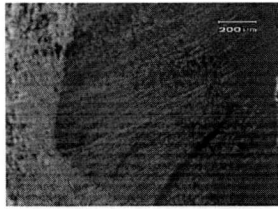
5X

10X

20X

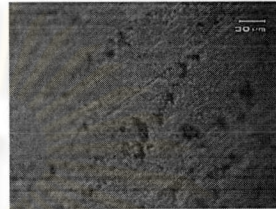
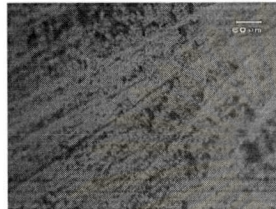
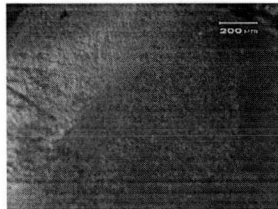
1.2 Enamel

1.2.1 Enamel surface was polished 30 second.



Ra = 0.110

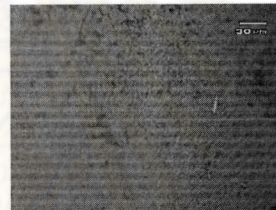
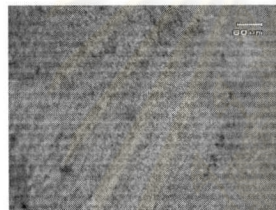
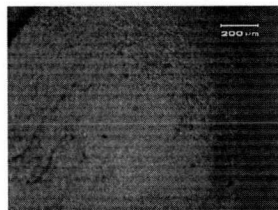
Flat surface



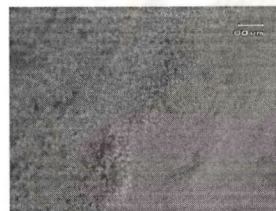
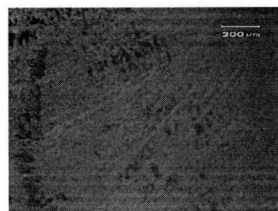
Ra = 0.079

Polished surface

1.2.2 Enamel surface was polished 60 second.

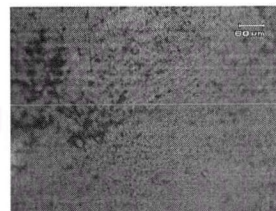


Flat surface

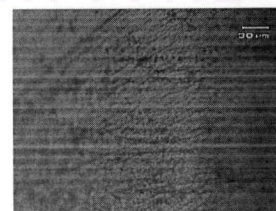
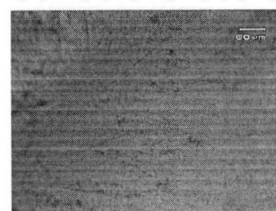
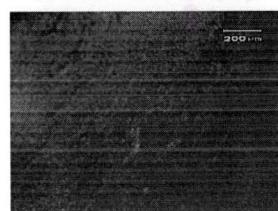


Polished surface

1.2.3 Enamel surface was polished 90 second.



Flat surface



Polished surface

5X

10X

20X

2. Dentin and enamel surface of flat surface and polished surface with silica -16 μm

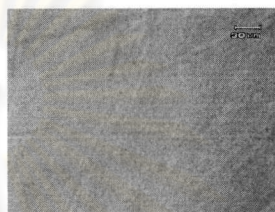
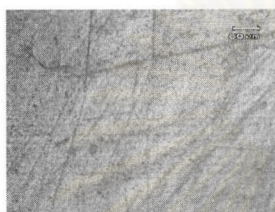
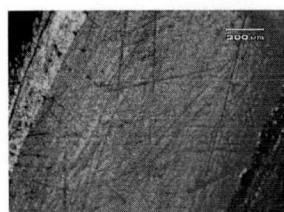
2.1 Dentin

2.1.1 Dentin surface was polished 30 second.



Ra = 0.098

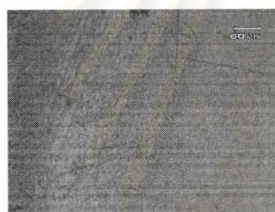
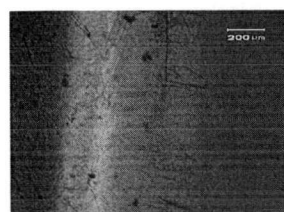
Flat surface



Ra = 0.081

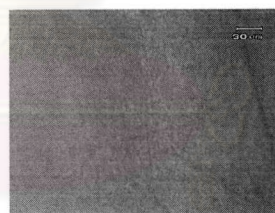
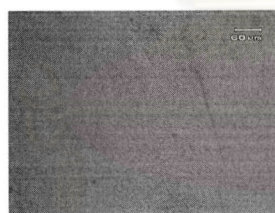
Polished surface

2.1.2 Dentin surface was polished 60 second.



Ra = 0.058

Flat surface



Ra = 0.047

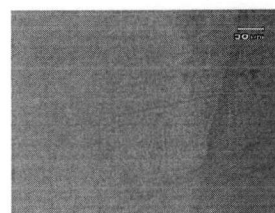
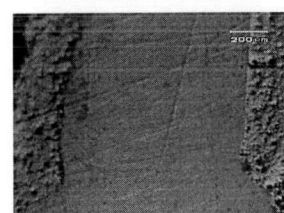
Polished surface

2.1.3 Dentin surface was polished 90 second.



Ra = 0.073

Flat surface



Ra = 0.058

Polished surface

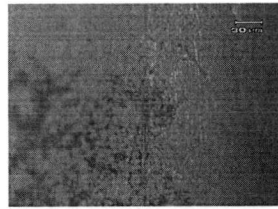
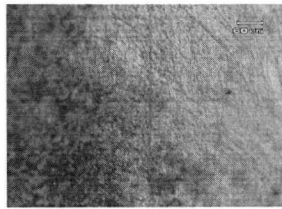
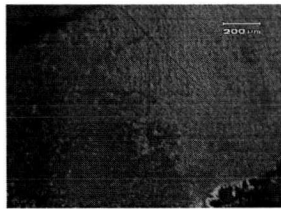
5X

10X

20X

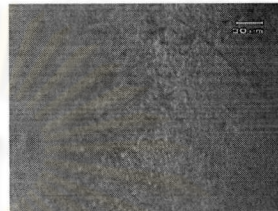
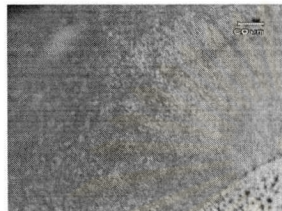
2.2 Enamel

2.2.1 Enamel surface was polished 30 second.



Ra = 0.033

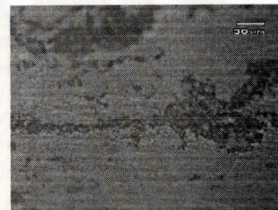
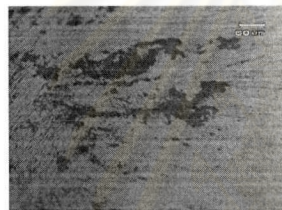
Flat surface



Ra = 0.181

Polished surface

2.2.2 Enamel surface was polished 60 second.

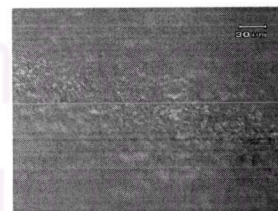
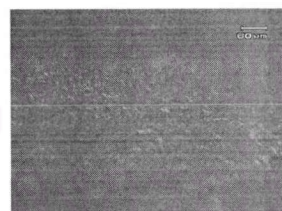
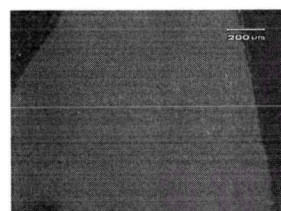


Flat surface

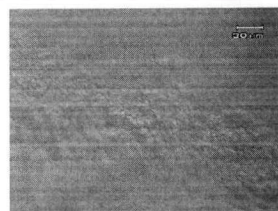
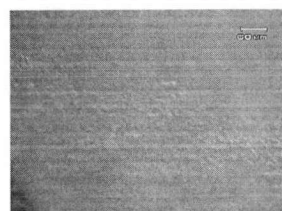
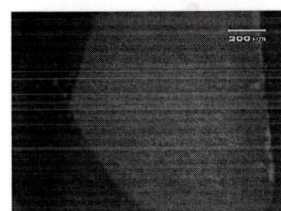


Polished surface

2.2.3 Enamel surface was polished 90 second.



Flat surface



Polished surface

5X

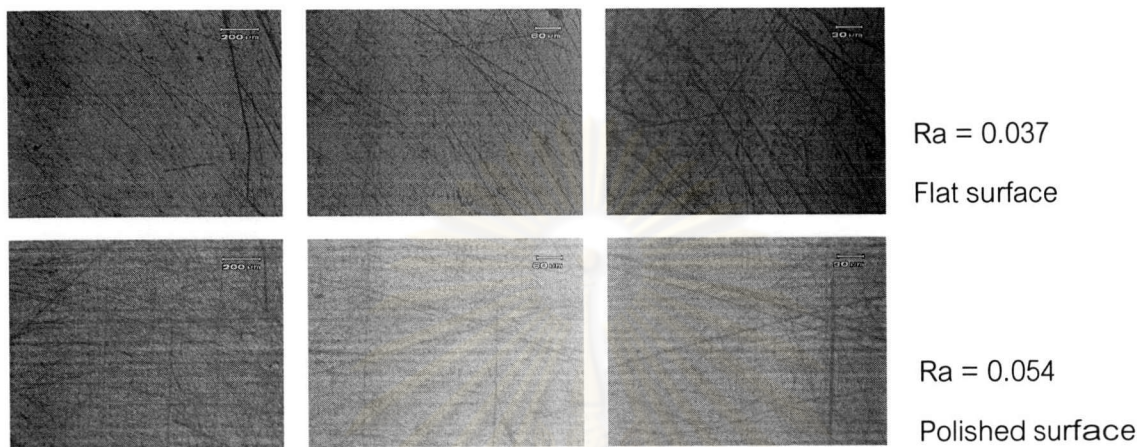
10X

20X

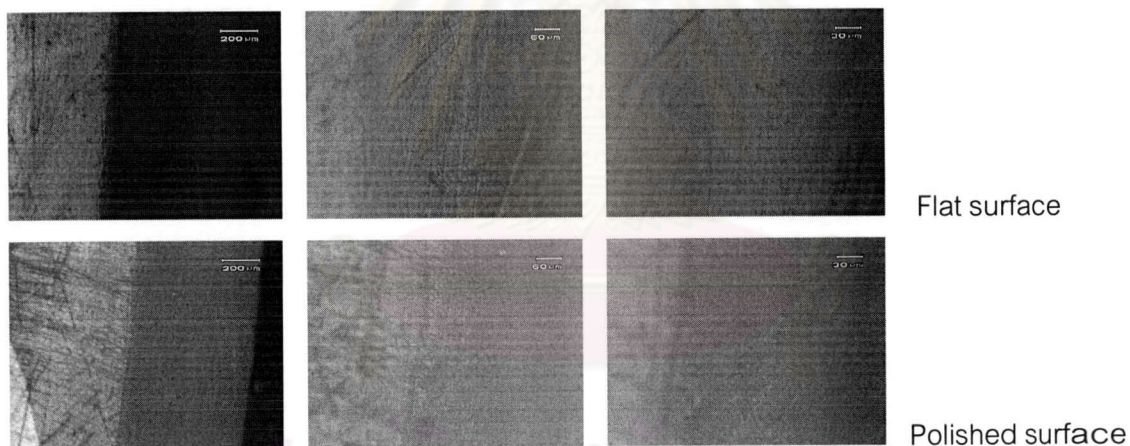
3. Dentin and enamel surface of flat surface and polished surface with calcined diatomite waste 45-63 μm

3.1 Dentin

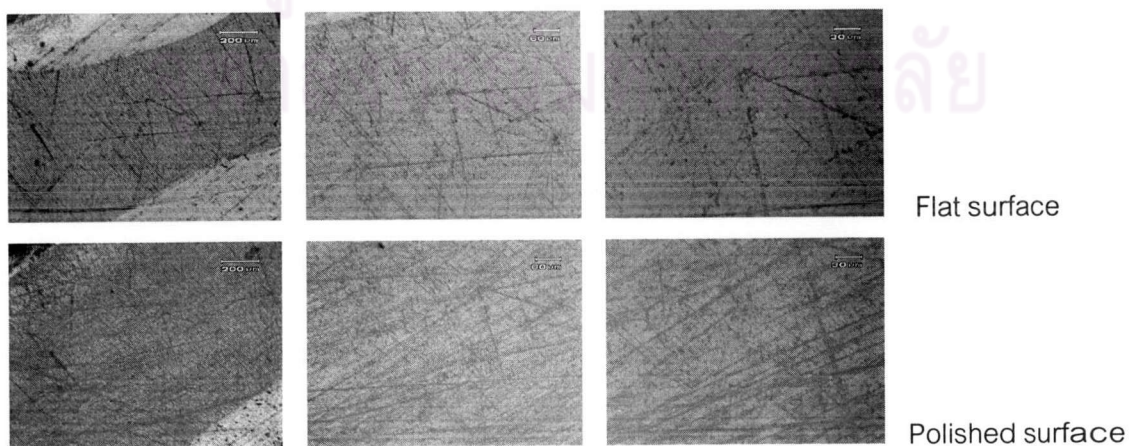
3.1.1 Dentin surface was polished 30 second.



3.1.2 Dentin surface was polished 60 second.



3.1.3 Dentin surface was polished 90 second.



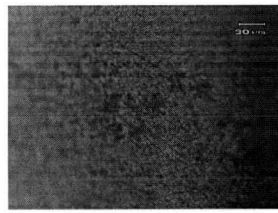
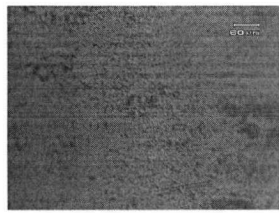
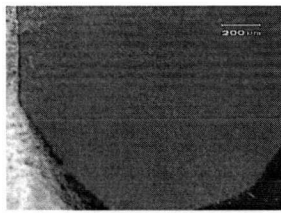
5X

10X

20X

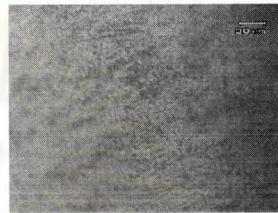
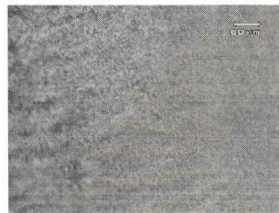
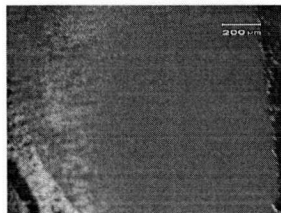
3.2 Enamel

3.2.1 Enamel surface was polished 30 second.



Ra = 0.104

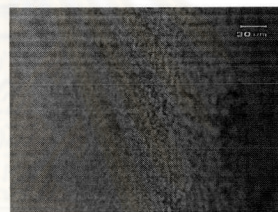
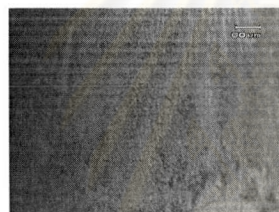
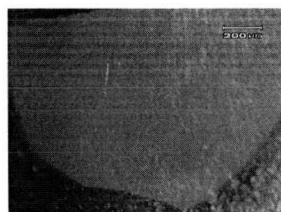
Flat surface



Ra = 0.099

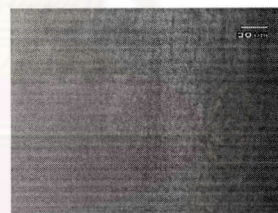
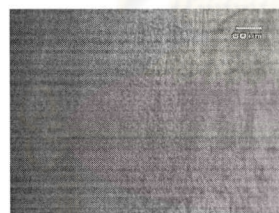
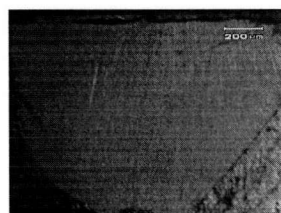
Polished surface

3.2.2 Enamel surface was polished 60 second.



Ra = 0.044

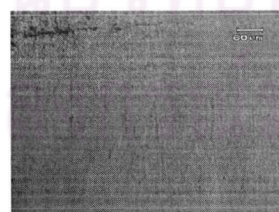
Flat surface



Ra = 0.064

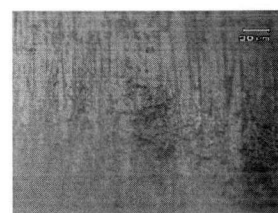
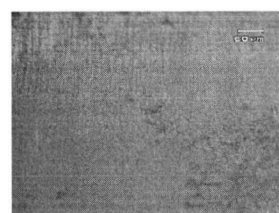
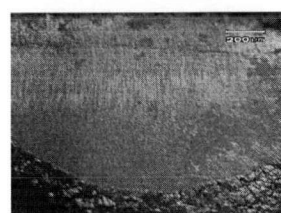
Polished surface

3.2.3 Enamel surface was polished 90 second.



Ra = 0.078

Flat surface



Ra = 0.043

Polished surface

5X

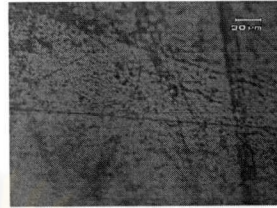
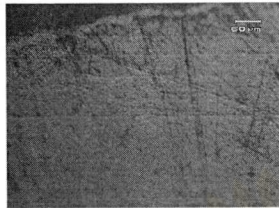
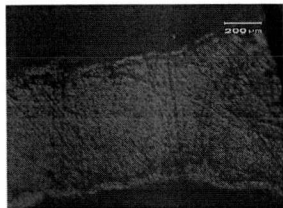
10X

20X

4. Dentin and enamel surface of flat surface and polished surface with perlite -16 μm

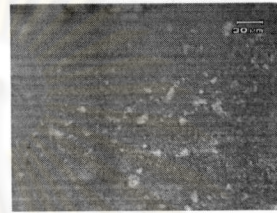
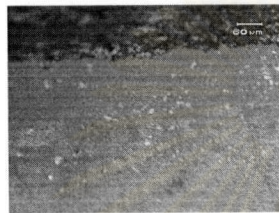
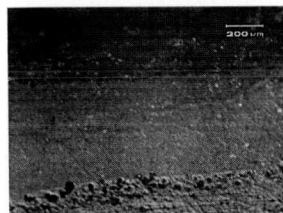
4.1 Dentin

4.1.1 Dentin surface was polished 30 second.



Ra = 0.131

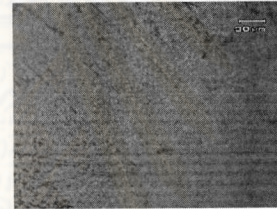
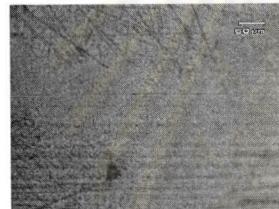
Flat surface



Ra = 0.095

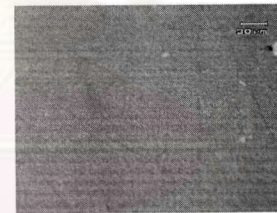
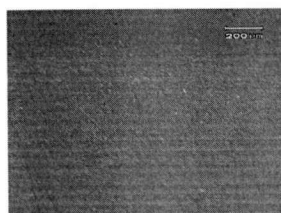
Polished surface

4.1.2 Dentin surface was polished 60 second.



Ra = 0.084

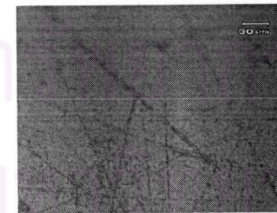
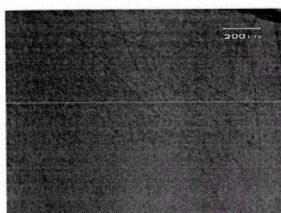
Flat surface



Ra = 0.128

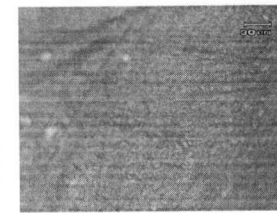
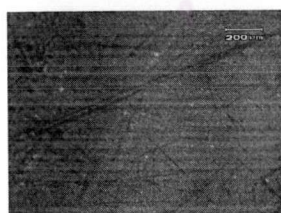
Polished surface

4.1.3 Dentin surface was polished 90 second.



Ra = 0.115

Flat surface



Ra = 0.167

Polished surface

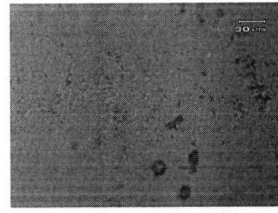
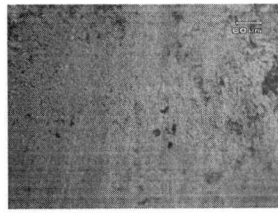
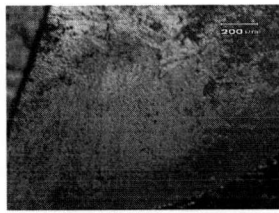
5X

10X

20X

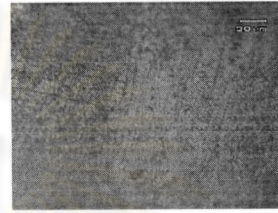
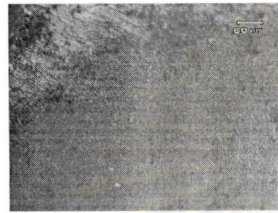
4.2 Enamel

4.2.1 Enamel surface was polished 30 second.



Ra = 0.109

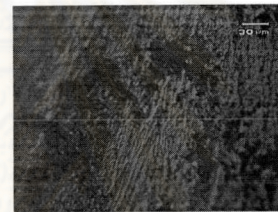
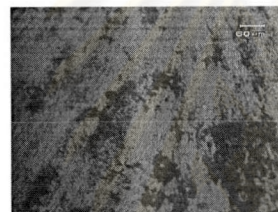
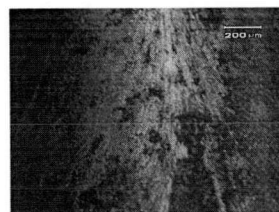
Flat surface



Ra = 0.072

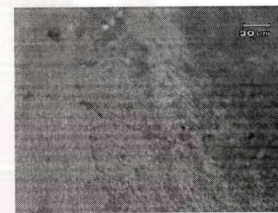
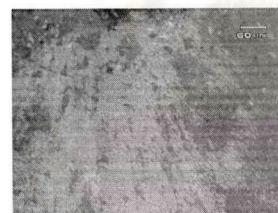
Polished surface

4.2.2 Enamel surface was polished 60 second.



Ra = 0.080

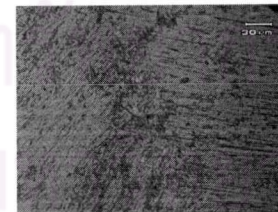
Flat surface



Ra = 0.159

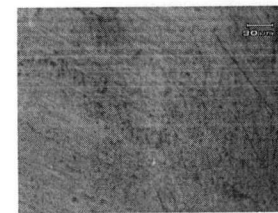
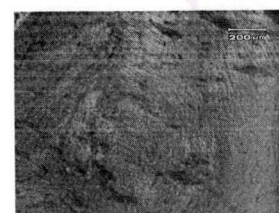
Polished surface

4.2.3 Enamel surface was polished 90 second.



Ra = 0.165

Flat surface



Ra = 0.072

Polished surface

5X

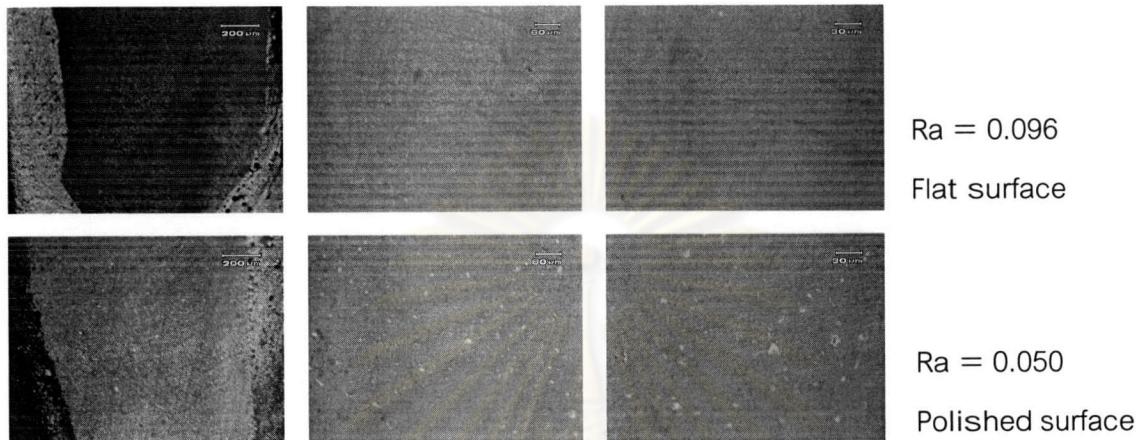
10X

20X

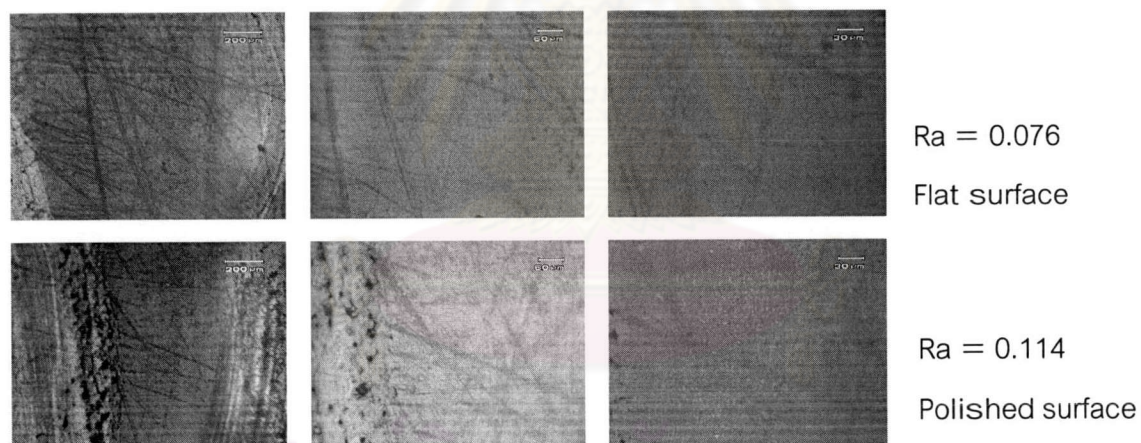
5. Dentin and enamel surface of flat surface and polished surface with perlite + diatomite 505 (1:1) (Both -16 μm)

5.1 Dentin

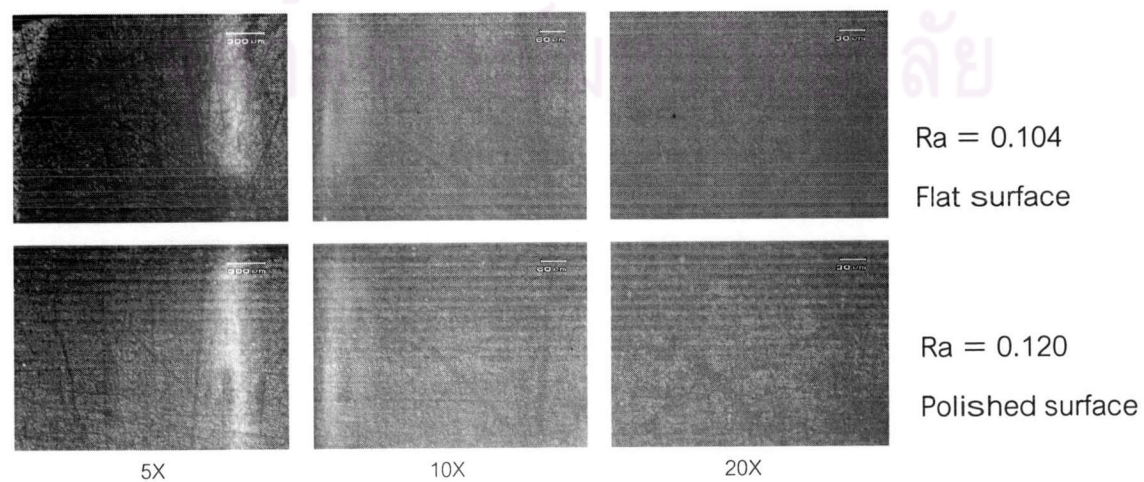
5.1.1 Dentin surface was polished 30 second.



5.1.2 Dentin surface was polished 60 second.

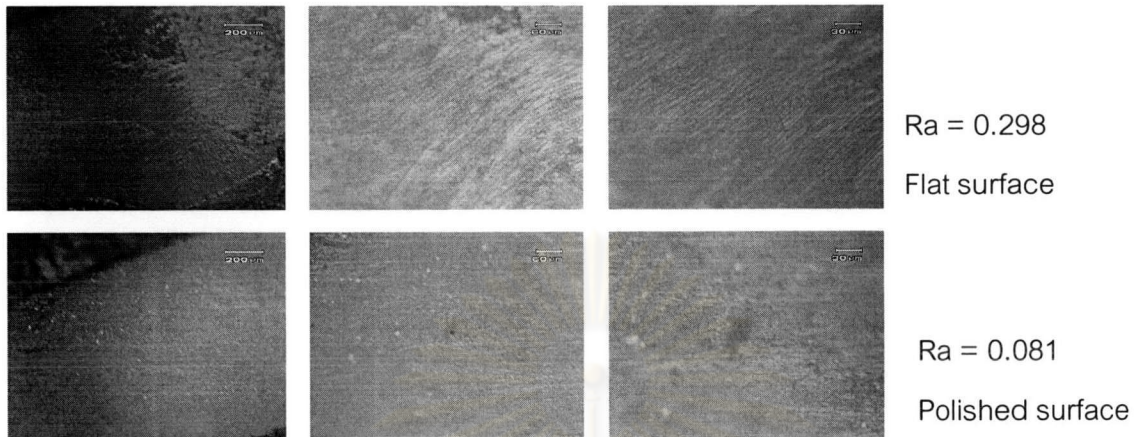


5.1.3 Dentin surface was polished 90 second.

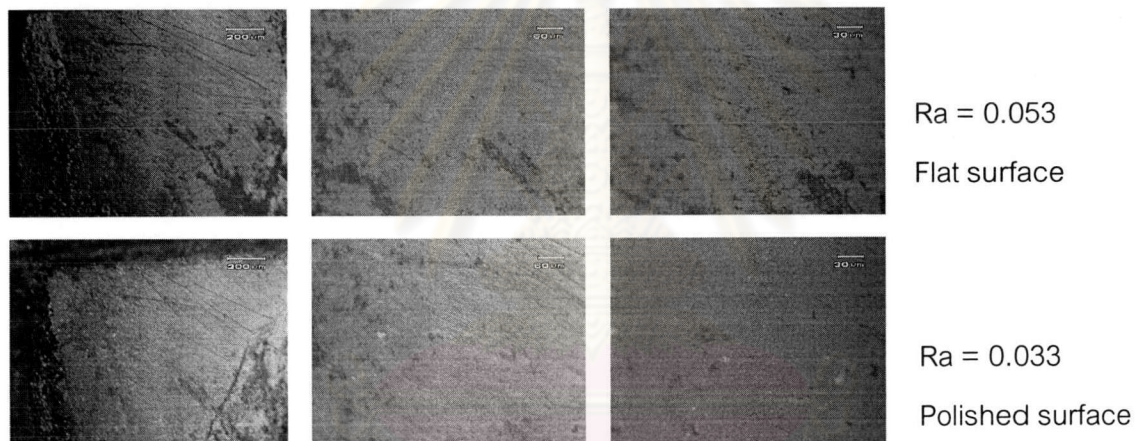


5.2 Enamel

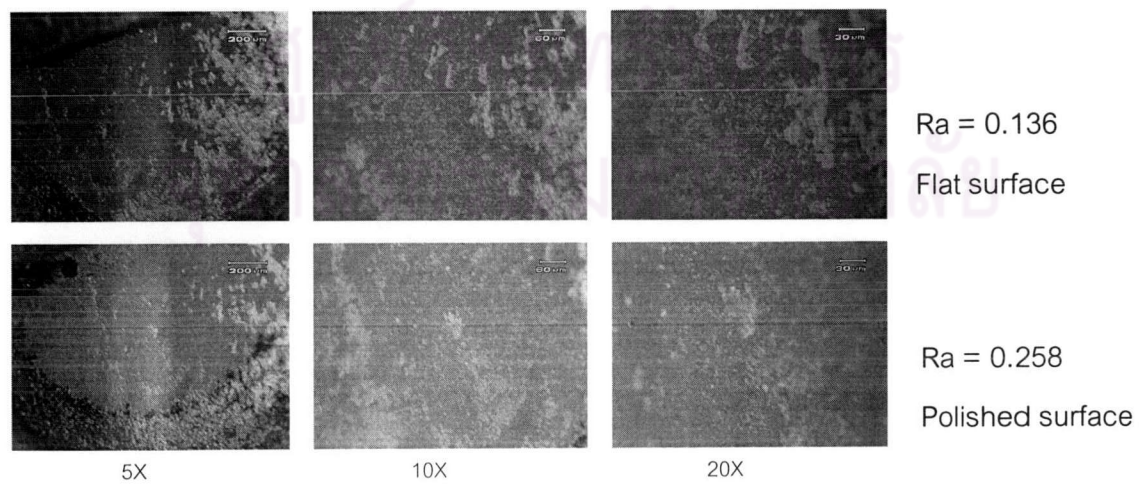
5.2.1 Enamel surface was polished 30 second.



5.2.2 Enamel surface was polished 60 second.



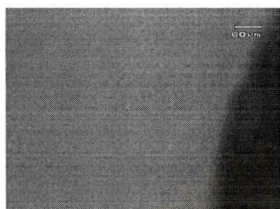
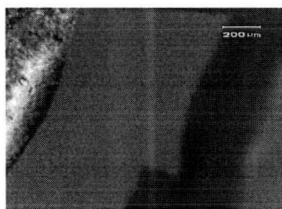
5.2.3 Enamel surface was polished 90 second.



6. Dentin and enamel surface of flat surface and polished surface with pumice -16 μm

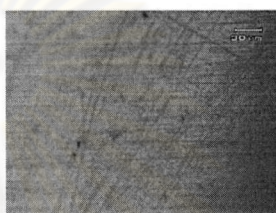
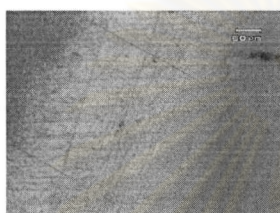
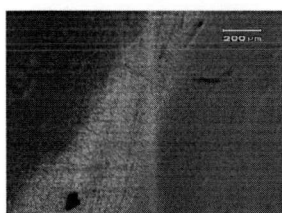
6.1 Dentin

6.1.1 Dentin surface was polished 30 second.



Ra = 0.175

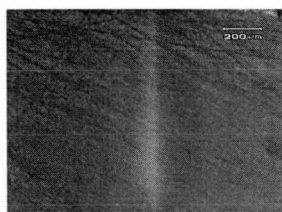
Flat surface



Ra = 0.158

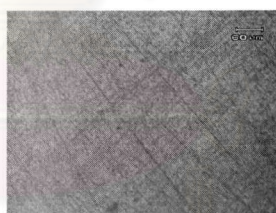
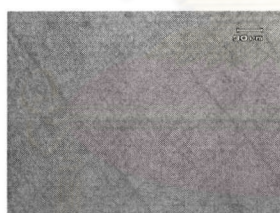
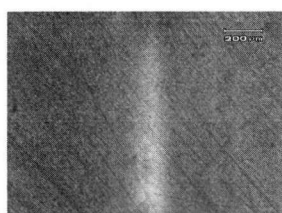
Polished surface

6.1.2 Dentin surface was polished 60 second.



Ra = 0.062

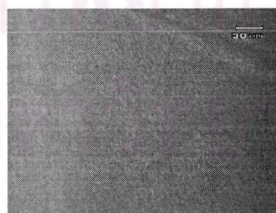
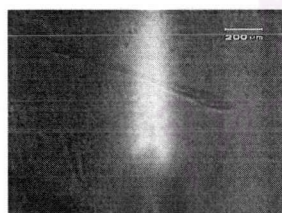
Flat surface



Ra = 0.096

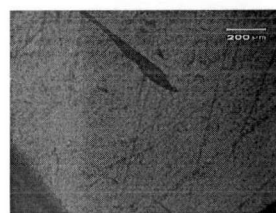
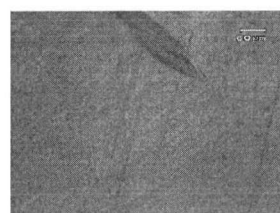
Polished surface

6.1.2 Dentin surface was polished 90 second.



Ra = 0.075

Flat surface



Ra = 0.057

Polished surface

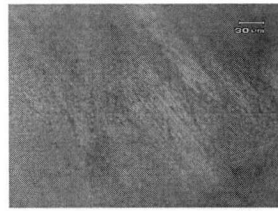
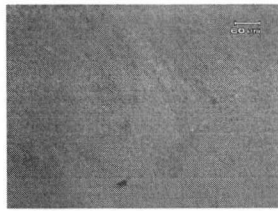
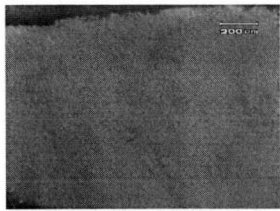
5X

10X

20X

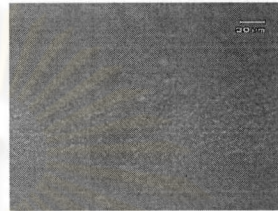
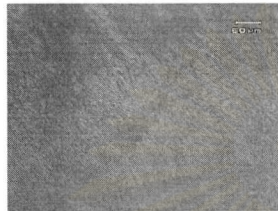
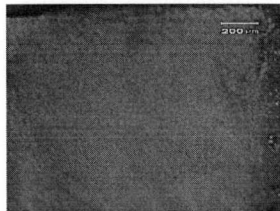
6.2 Enamel

6.2.1 Enamel surface was polished 30 second.



Ra = 0.054

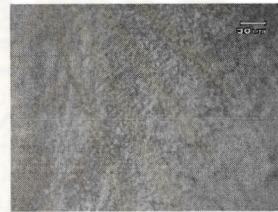
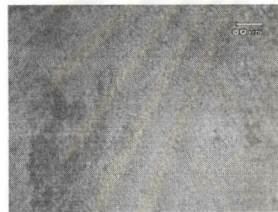
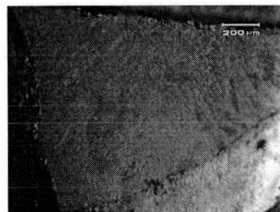
Flat surface



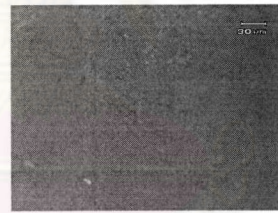
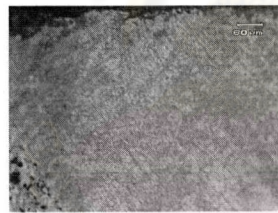
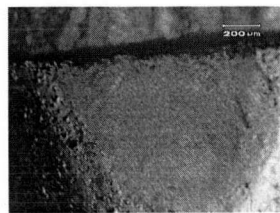
Ra = 0.084

Polished surface

6.2.2 Enamel surface was polished 60 second.

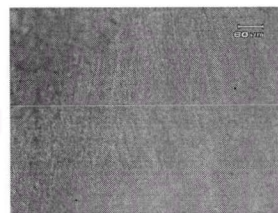
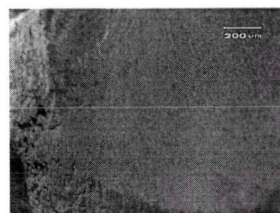


Flat surface

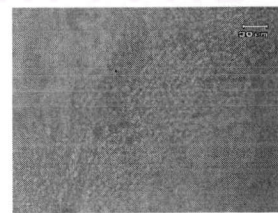
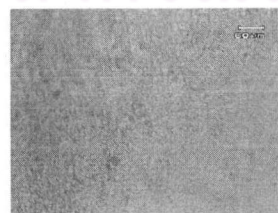
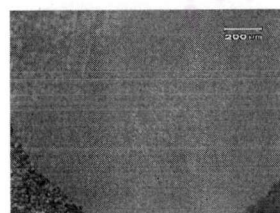


Polished surface

6.2.3 Enamel surface was polished 90 second.



Flat surface



Polished surface

5X

10X

20X

Appendix C

The effect of time on Ra

Dentin surface

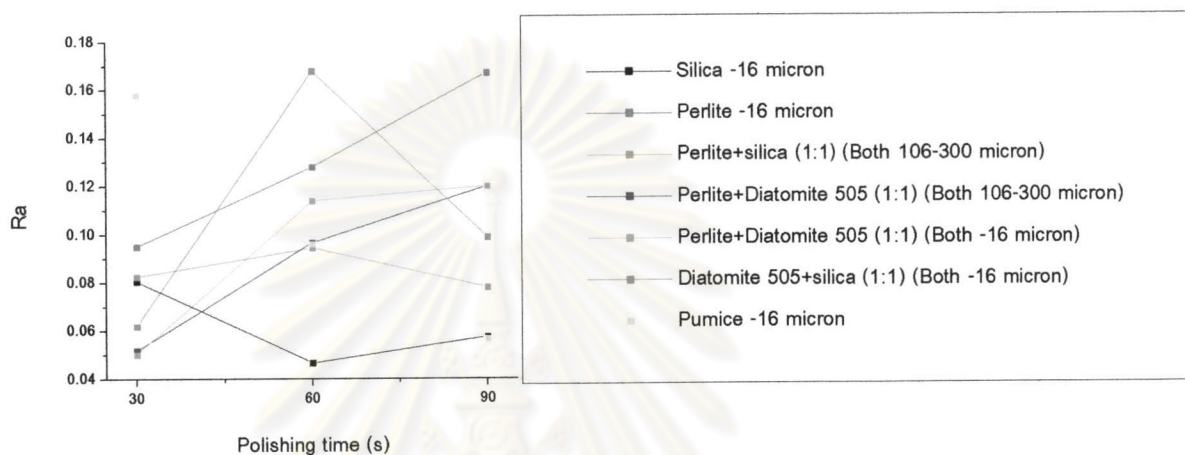


Fig. 1 Average roughness after polishing dentin surface with prepared prophylaxis paste at 30, 60, 90 s.

Enamel surface

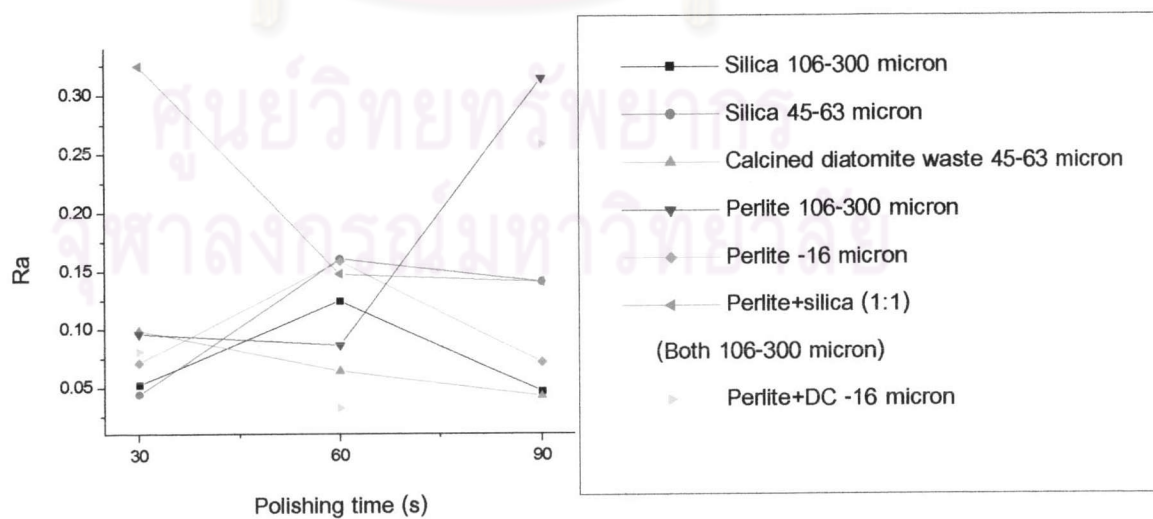
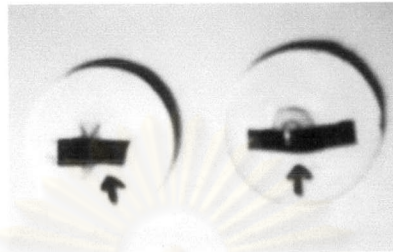


Fig. 2 Average roughness after polishing enamel surface with prepared prophylaxis paste at 30, 60, 90 s.

Appendix D

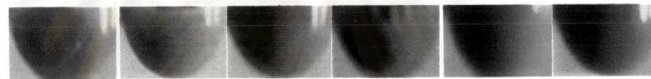
The prepared of dentin and enamel



Dentin

Enamel

The prepared prophylaxis paste



(a)

(b)

(c)

(d)

(e)

(f)

(a) Silica

(b) Diatomite hyflow

(c) Nupro

(d) Diatomite waste

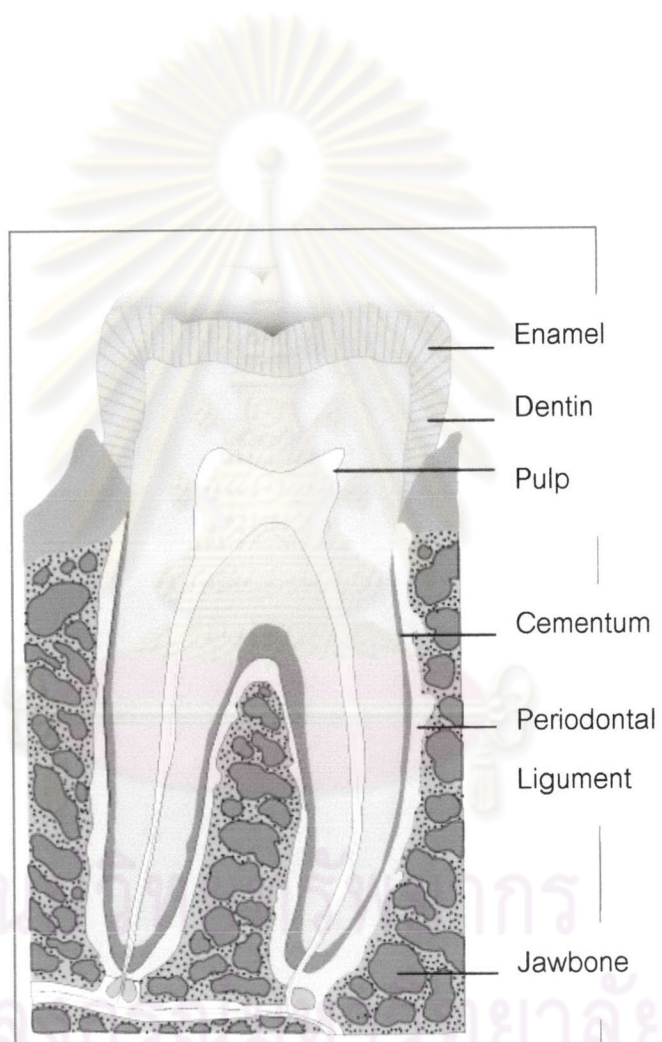
(e) Perlite AP-120

(f) Pumice

(Most – 16 micron)

Appendix E

The tooth structure



Appendix F

Abrasion

Abrasion is the process of wear on the surface of one material by another material by scratching, gouging, chiseling, tumbling, or other mechanical means. The material that causes the wear is called an abrasive; the material being abraded is called the substrate.

Polishing

Polishing is the process of making a rough surface smooth to the touch and glossy (mostly specular reflection of incident light) in Fig 1 (a). Polishing is usually performed with very small particle size (sub-micron) abrasives.

Grinding

Grinding is the gross reduction of the surface of a substrate by abrasion. It is usually performed with large particle size abrasives. The surface texture of the substrate after a grinding procedure is usually rough to the touch and diffuse reflection to incident light in Fig 1 (b).

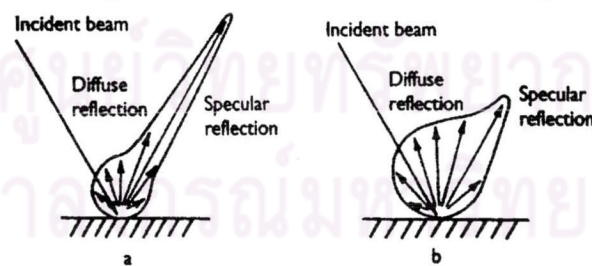


Fig. 1 Schematic diagram of diffuse and specular reflection:

(a) high gloss, (b) Low gloss

Factors affecting of abrasion

1. *A large difference in hardness between the abrasive and substrate.* Mohs values indicate one material's resistance to scratching by another shown in Table 1.

Table 1 Hardness of dental abrasives and substrates

Material	Hardness scale (Mohs)
Abrasives	
Pumice	6
Sand	7
Zirconium silicate	7-7.5
Aluminum oxide	9
Silicon carbide	9-10
Substrates	
Dentin	1-4
Enamel	5-6
Porcelain	6-7

2. *The particle size* of an abrasive may be expressed in micrometers. By convention, particles are classified as fine (0-10 μm), medium (10-100 μm), and coarse (100-500 μm), according to average particle size. Large abrasive particles will abrade a surface more rapidly than smaller particles. However, they tend to leave coarser scratches in the abrade surface than fine particles. Equivalent-size scratches can be produce by difference sizes of particles by varying the applied pressure in Fig 2 (a).
3. *The particle shape* also has an effect on rate of abrasion. Sharp, irregular shaped particles will abrade surface more rapidly than rounded particles having duller cutting angles. However, the former will produce deeper scratches than the latter in Fig 2 (b). The abrasion rate of an abrasive decrease during use; this

is due partly to rounding of the particles and partly to contamination of the abrasive with some of the substrate material (debris).

4. *The greater the speed* at which the abrasive travels across the surface of the substrate, the greater abrasion. The greater friction at higher speed. However, tend to create higher temperatures at the surface of the substrate.
5. *The greater the pressure* applied. The greater the pressure produces deeper and wider scratches in Fig 2 (c) and creates higher temperatures.
6. *Lubricants* (Silicone grease, water spray, and glycerol) are used during abrasion for two purposes: to reduce heat buildup, and to wash away debris to prevent clogging or blinding of the abrasive instrument. Too much lubrication can reduce the abrasion rate because it may prevent some of the abrasive from coming in contact with the substrate.

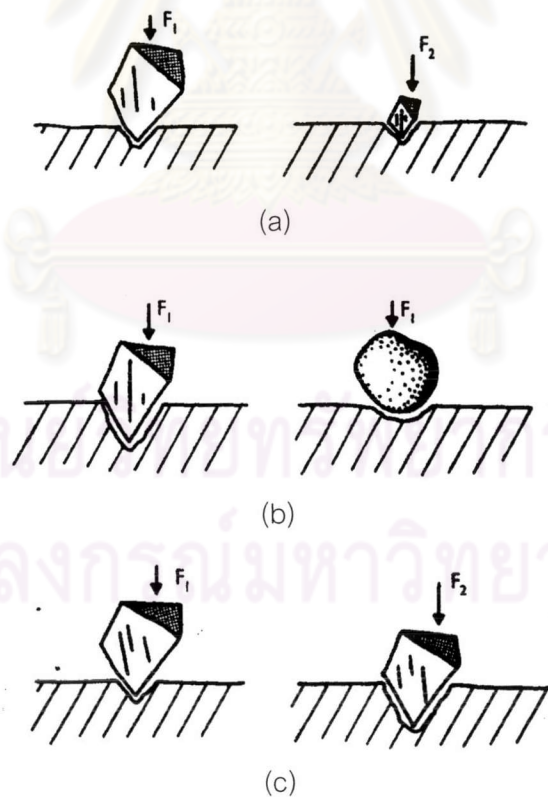


Fig 2 Factors affecting abrasion. (a) Large particle produces similar scratches with lower applied force (F_1) than smaller particle. (b) Sharp particle produces deeper

abrasion than rounder particle under applied force. (c) Deeper and wider scratches are produced by increasing the applied force from F_1 to F_2

Applications of abrasives

Prophylaxis paste

Prophylaxis paste should be chosen carefully and applied to remove exogenous stains without damaging the underlying tooth structure or adjacent restorative materials.

Dentifrices

Dentifrices are used for removing debris and minor stains from teeth and for polish tooth surface. The most commonly used abrasives are dibasic calcium phosphate, tricalcium phosphate, calcium pyrophosphate, and hydrated alumina. Many dentifrices contain therapeutic agents, such as sodium fluoride, stannous fluoride, or sodium monofluorophosphate, to decrease the acid solubility of tooth enamel, decrease hypersensitivity, and interrupt the mechanisms of plaque attachment and calculus formation on tooth structure.

Denture cleaners

Food debris, plaque, calculus, and stains may accumulate on denture base materials in the same way as natural teeth and are best removed on a regular basis by the patient. Daily soaking in the denture cleanser solution or brushing with or without a paste or powder is usually effective.

Chemical cleansers may contain sodium perborate, which releases peroxide. As peroxide decomposes, oxygen is released, resulting in effervescence. Effervescence, along with the oxidizing ability of peroxide, is assumed to be responsible for the cleaning action.

Biography

Miss Parawee Chaono was born on November 20th, 1980 in Bangkok Province. After graduation with a bachelor degree in Industrial Chemistry from Faculty of Science, Chaingmai University in 2001. She continued a further study for master's degree in the field of Ceramic Technology at Chulalongkorn University in 2002.



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