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APPENDICES

Appendix A Scanning electron microscopy.

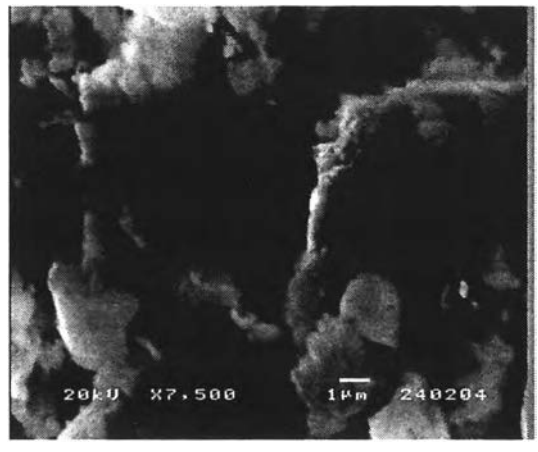
Scanning electron microscopy is a practical technique used for studying morphology of polymers and identification of the elemental constituents of the area of specimen. This technique uses electron beam, usually from tungsten filament to interact with solid surface. When electron beam impinges the surface, three types of interaction may occur i.e., backscattered electron, secondary electron and X-ray photon.

To qualify and quantify the element at the surface, electron dispersive detector was used. A SEM-JEOL JSM 5200-2AE with a magnification of the images was 7500 times at 20 kV.

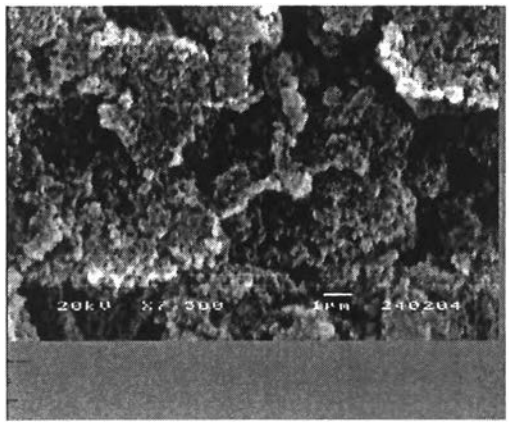
All of dispersing chemicals must have particle size less than 5 μm which is an average particle size of rubber particle. For morphology study, all of dispersing chemicals such calcium carbonate, admicelled silica, precipitated silica, sulphur, wingstay-l, ZDEC and ZnO were dried on stubs. Each stub were coated by gold and scanned by SEM with magnification 7500 times at 25 KV to check particle size of each dispersing chemicals.

There were two difference functions of the dispersing chemicals which were filler and vulcanization. All of them were scanned by SEM to check average particle size as shown in Figure A1 and Figure A2 respectively.

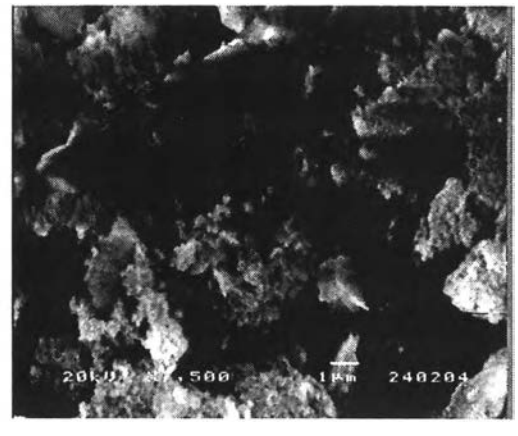
Filler



(a) ~ 3 μm



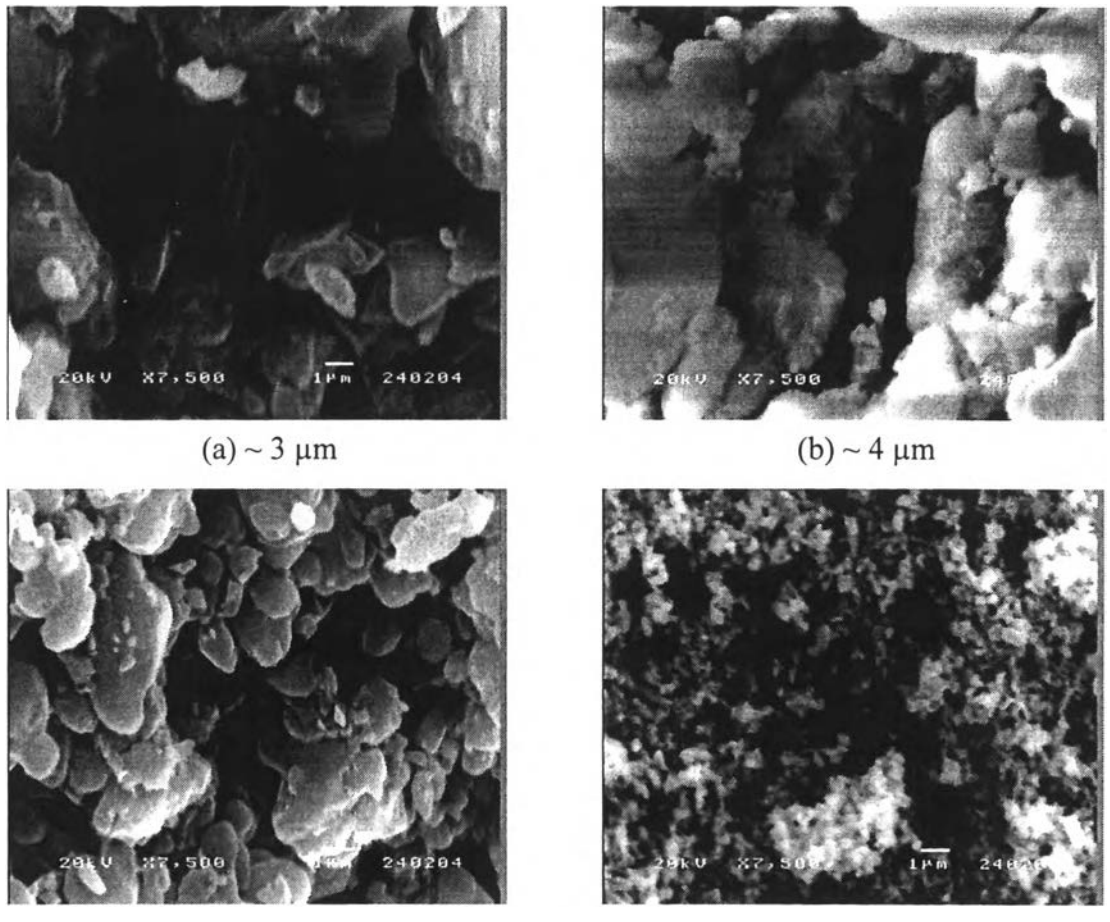
(b) ~ 0.5 μm



(c) ~ 2 μm

Figure A1 SEM micrographs of the variety of filler (a) Calcium carbonate (b) Admicelled silica (c) Precipitated silica.

Vulcanizing agent



(a) ~ 3 μm (b) ~ 4 μm

(c) ~ 2 μm (d) ~ 0.5 μm

Figure A2 SEM micrographs of the variety of filler (a) Sulphur (b) Wingstay-L (c) ZDEC (d) ZnO

Appendix B The effect of sulphur content on the mechanical properties of rubber film.

Natural rubber latex (NR)

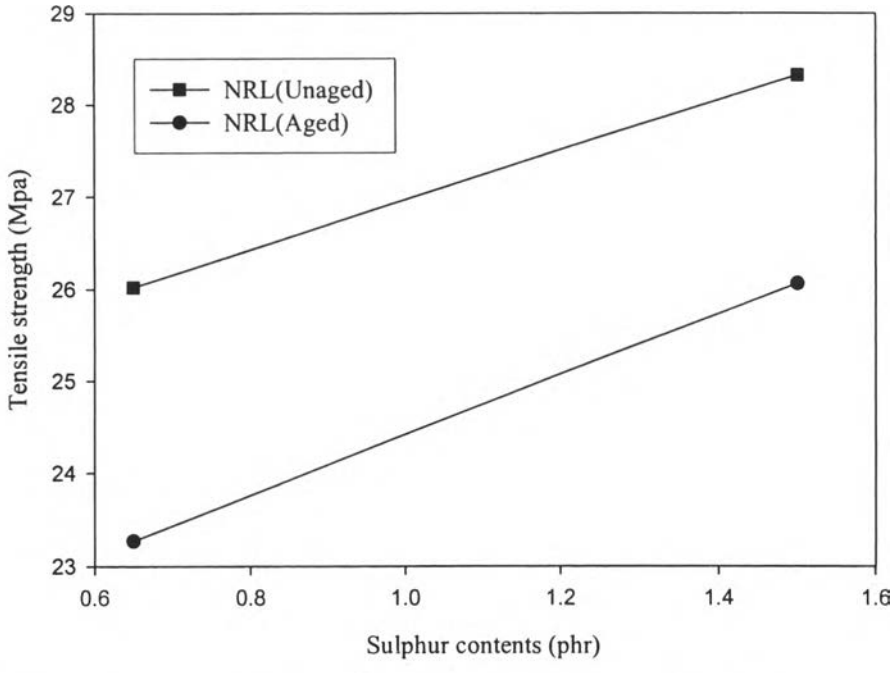


Figure B1 Tensile strength of unaged and aged vulcanized NR films.

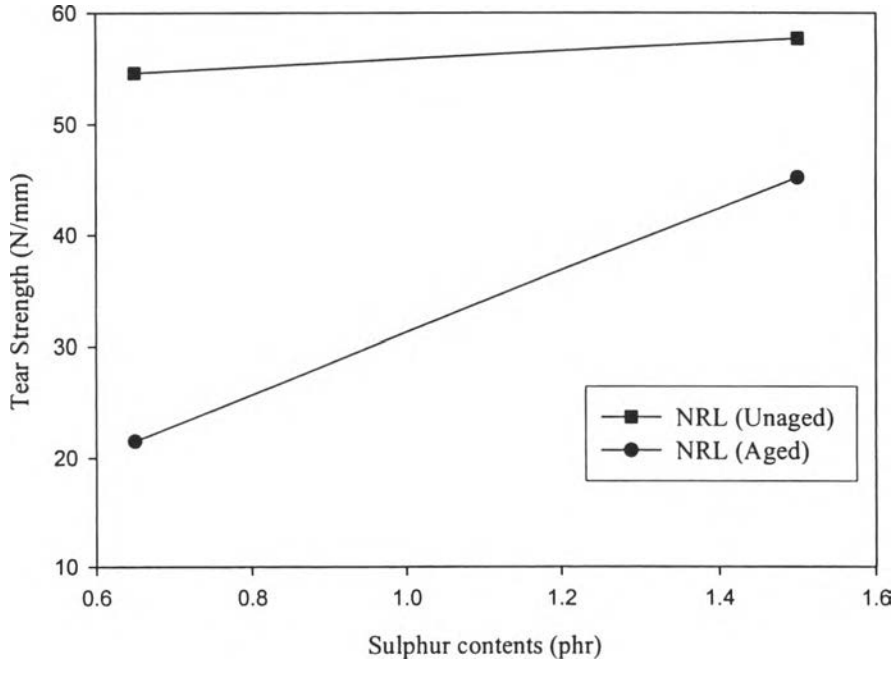


Figure B2 Tear strength of unaged and aged vulcanized NR films.

Deproteinized Natural rubber latex (DPNR)

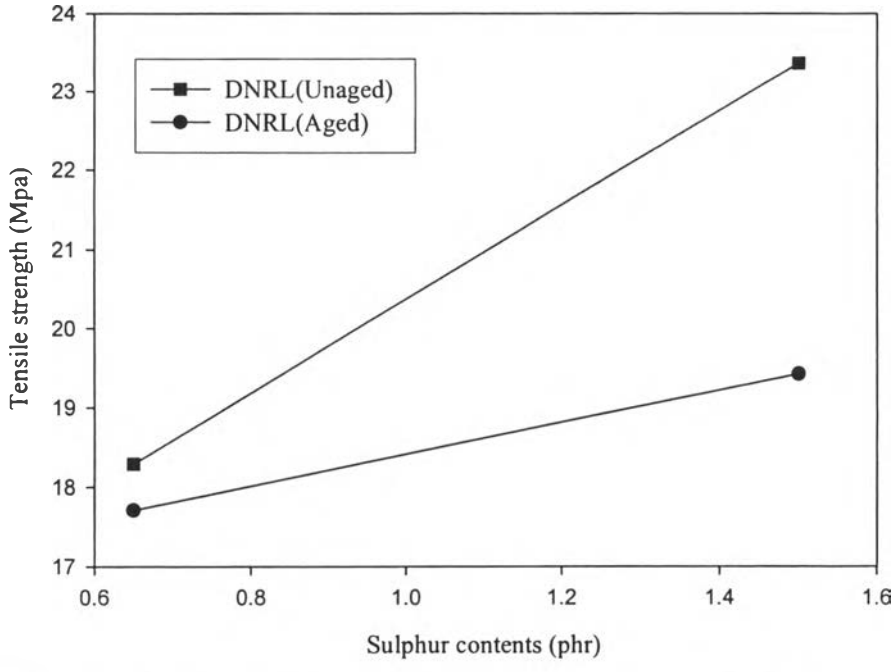


Figure B3 Tensile strength of unaged and aged vulcanized DPNR films.

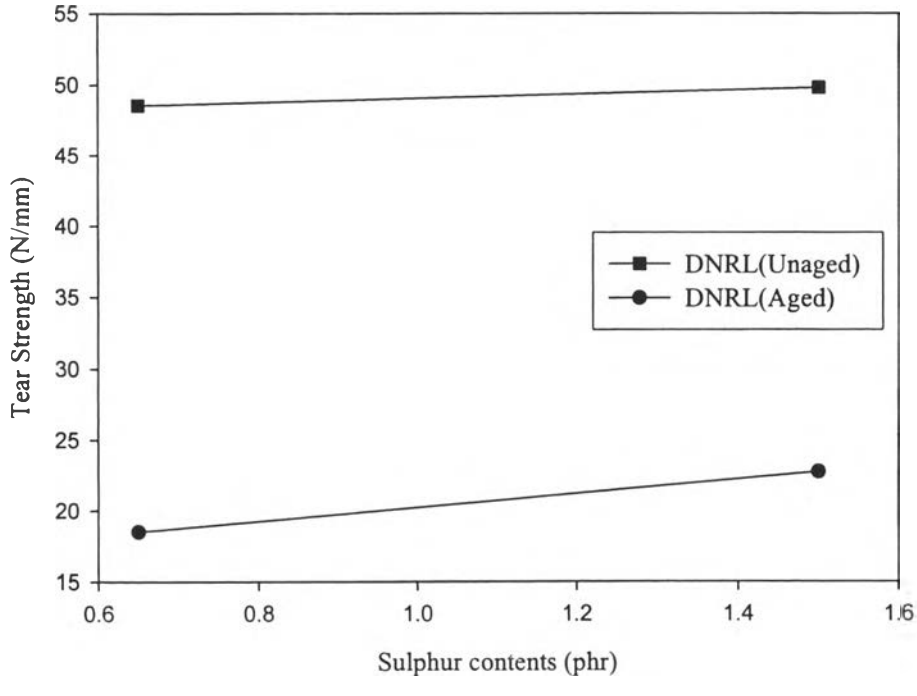


Figure B4 Tear strength of unaged and aged vulcanized DNRL films.

CURRICULUM VITAE

Name: Mr. Jaruwat Khamsook

Date of Birth: June 29, 1980

Nationality: Thai

University Education:

1998-2002 Bachelor Degree of Chemistry, Faculty of Science, Srinakarinwirot University, Bangkok, Thailand.