

CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

In this work, the poly-crystal transparent alumina preparation can be achieved by using submicrometer alumina particles with simple slip casting technique.

With the slip casting, the alumina green body with high density and strength can be obtained by using appropriate proportion of additives which are deflocculant and binder. It was experimentally found that alumina green body with over 60% relative density can be obtained when slurries with solid concentration of 75% and PMMA deflocculant concentration of 1.25% were employed. Moreover, adding CMC of 0.05 wt% helps enhance green body strength but provides an insignificant effect on its density.

In order to prepare green body with high density and strength for fabrication of transparent alumina, calcium ion contamination must be removed from gypsum mold. This kind of contamination provided negative effect on densification and growth of grains behavior after sintering. From experimental results, it could also be found that using acid treatment not only results in calcium removal, but also helps decrease sintering temperature. Very dense specimen with uniform grain size could be obtained after sintering in air followed by HIP treatment. It was also found that acid treatment could provide significant effect to enhance the transparent properties of alumina ceramic.

6.2 Recommendation for future work

1. To investigate the lower sintering temperature region to evolve better alumina ceramic, having smaller grain size.
2. To investigate the HIP condition to evolve better transparent alumina ceramic.
3. To investigate the roles of dopant giving color to the transparent alumina ceramic.
4. To prepare the transparent alumina ceramic with the complicated shape.