

## ABSTRACT

Zirconium oxide ( $ZrO_2$ ) or commonly known as zirconia, found in the form of white crystalline powder with monoclinic crystalline structure, and it is a typically insoluble material in aqueous solutions. Zirconium oxide crystalline structure will change due to the temperature increase, its natural monoclinic structure will form a tetragonal structure if heated up to  $1170^\circ C$  and to cubic form if heated up to  $2370^\circ C$ .

There are few studies, if not scarce, of dissolution rate of the zirconia in the cubic form in normal water solutions under various conditioned parameters: pH, solution composition and temperature. The aim of this study specifically is to find the parameters controlling the dissolution of monoclinic and cubic form zirconia in the acidic media. One of the parameters assessed will concern the surface area and surface energy in contact with the solution.

Based on the previous research, a set of solubility data has already obtained for each monoclinic and cubic zirconia dissolved in acidic media. The continuity of that research is what conducts this study. By treating the data using a Thermogravimetry Analysis (TGA), the values of mean free surface energy ( $\bar{\gamma}$ ) for monoclinic and cubic zirconia collectively are 2.66 and 2.59  $J/m^2$ .

Keywords: zirconia, crystallographic, dissolution, thermogravimetry analysis, etc.

