The effect of film thickness on the depth-wise microstructure of rod-shaped polyimide

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Polyimide films are widely used in microelectronic devices such as flexible printed circuit board and smart devices due to their outstanding physical and electrical properties. Recently, demands on PI having highly reliable electric properties are increased. One possible approach to meet this need is to increase the film thickness. However, when the film thickness is increased, unexpected problems such as curling and deterioration of adhesion proprety can be occurred. They are related to the microstructure of PI which is developed during the manufacturing processes. So, it is important to understand what determines this microstructure of polyimide and how we control it. In this research, microstructure of dried poly(amic acid) (PAA), the precursor of PI, was estimated, and the role of this remaining solvent on the rate of imidization was investigated. Finally, degree of in-plane chain orientation was measured and compared with the microstructure of dried PAA. The results suggested final chain orientation of PI was affected by the microstructure of dried PAA especially when a film is thick.