

Surface and Dielectric Properties of Oxyfluorinated Polyimide Thin Film

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One of the most important applications of polyimide is used as the inter-level dielectric insulators (ILD). In order to achieve maximum possible device speed through smaller dimensions, an insulating materials with a dielectric constant as small as possible is preferred. In this work, the effects of oxyfluorination on surface and dielectric characteristics of polyimide thin film are studied using Fourier Transform-IR (FT-IR) spectorcopy, X-ray photoelectron spedctroscopy (XPS), and dielectric spectrometer. As experimental results, it is found that oxyfluorinated polyimide thin films have less dielectric constant than that of non-treated polyimide. These results are explained that the replacement of bulk fluorine and oxygen molecules lead to the decrease of the local electronic polarizability of polyimide, or to the increase of the free volume, which can be attributed to the relatively large volume of fluorine and oxygen molecules.