

PROPERTIES OF THE CRYSTALLINE POLYIMIDE FILM
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ABSTRACT

Ionized cluster beam deposition (ICBD) technique has been employed to fabricate high-purity crystalline polyimide (PI) film. The pyromellitic dianhydride (PMDA) and oxydianiline (ODA) were deposited using dual ICB sources. Fourier transform infrared spectroscopy (FT-IR), X-ray photoemission spectroscopy (XPS), and Transmission electron microscopy (TEM) study show that the bulk and surface chemical properties and the crystalline structure are very sensitive to the ICBD conditions such as cluster ion acceleration voltage and ionization voltage. At optimum ICBD conditions, the PI films have a maximum imidization, negligible impurities (~1% isoimide), and a good crystalline structure probably due to the high surface migration energy and surface cleaning effect. These characteristics are superior to those of films deposited by other techniques such as solvent cast, vapour deposition, or sputtering techniques.