Optical properties of erbium oxide thin films deposited by electron beam evaporation

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Abstract

Erbium oxide thin films were deposited by electron beam evaporation on substrates heated to 300 °C. The effect of the introduction of oxygen on the structural, chemical and optical properties of the films was investigated. The films were characterized using X-ray diffraction, X-ray photoelectron spectroscopy and normal-incidence transmittance and reflectance. The films had microcrystallites embedded in an amorphous matrix, and their stoichiometry was dependent on the oxygen partial pressure. The transmittance spectra of the films revealed that they were optically inhomogeneous. A model based on an inhomogeneous layer was applied to extract the refractive index and extinction coefficient from the transmittance and reflectance spectra.

Keywords: Erbium oxide; Inhomogeneous films; Optical coatings; Optical properties