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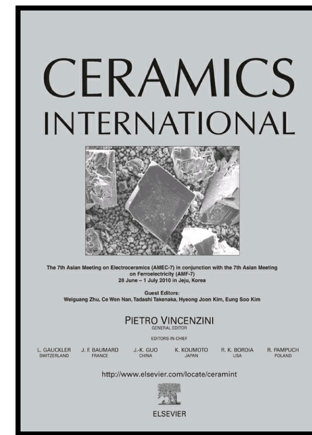

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Film thickness effect on texture and residual stress sign transition in sputtered TiN thin films

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Abstract

Residual stress in thin films and coatings strongly affects their properties and behavior in service. Comprehensive understanding and precise measurements of residual stress are prerequisites for preparing high quality films and coatings. Residual stresses in TiN films with different thickness were measured by X-ray diffraction (XRD) employing the $\cos^2 \alpha \sin^2 \psi$ method with certain optimization. Grazing incidence parallel beam optics was combined with side-inclination geometry using in-house designed sample stage to ensure results accuracy. To validate this method, TiN films with the thickness ranging from 1 to 3 μm were deposited on (100) Si single crystal substrates at 300 °C by RF

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