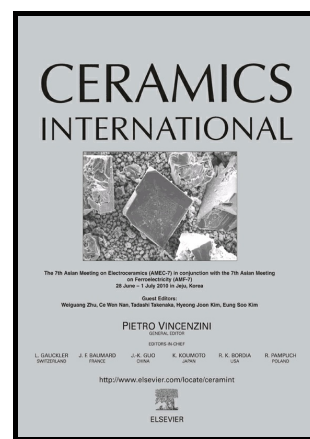


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**Ferroelectricity in ultrathin yttrium-doped hafnium oxide films
prepared by chemical solution deposition based on metal chlorides
and alcohol**

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Abstract

We suggest a facile way to prepare precursor solutions with metal salts and alcohol and fabricate ultrathin ferroelectric yttrium-doped hafnium oxide films on Pt(111)/TiO₂/SiO₂/Si substrates by chemical solution deposition and post-annealing treatment. The samples were prepared with 5.2 mol% yttrium-doping and had a thickness ranging from 3 nm to 9 nm. We also varied the post-annealing temperature from 600 °C to 800 °C. The ultrathin films were characterized by transmission electron microscopy (TEM) and Raman spectroscopy. Their local ferroelectric properties were investigated by piezoresponse force microscopy (PFM) for domain imaging and polarization switching at nanoscale.

Keywords: A. Films; C. Ferroelectric properties; D. Transition metal oxides

1. Introduction

Hafnium oxide, HfO₂, is commonly used in optical coatings and high- κ dielectric insulators. Ever since the discovery of ferroelectricity in Si-doped HfO₂ in 2011 [1], HfO₂ has attracted much attention because of its compatibility with the standard semiconductor technology and its potential as a lead-free alternative for

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