Synthesis and characterization of hafnium oxide films for thermo and

photoluminescence applications

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a b s t r a c t

Hafnium oxide (HfO2) films were deposited by the ultrasonic spray pyrolysis process. The films were

synthesized from hafnium chloride as raw material in deionized water as solvent and were deposited on

corning glass substrates at temperatures from 300 to 600 1C. For substrate temperatures lower than

400 1C the deposited films were amorphous, while for substrate temperatures higher than 450 1C, the

monoclinic phase of HfO2 appeared. Scanning electron microscopy showed that the film’s surface

resulted rough with semi-spherical promontories. The films showed a chemical composition close to

HfO2, with an Hf/O ratio of about 0.5. UV radiation was used in order to achieve the thermoluminescent

characterization of the films; the 240nm wavelength induced the best response. In addition,

preliminary photoluminescence spectra, as a function of the deposition temperatures, are shown.