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**Characterization of luminescent**

**samarium doped HfO2 coatings**

**synthesized by spray pyrolysis technique**

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**Abstract**

Trivalent samarium (Sm3+) doped hafnium oxide (HfO2) films were deposited using the spray

pyrolysis deposition technique. The films were deposited on Corning glass substrates at

temperatures ranging from 300 to 550 ◦C using chlorides as raw materials. Films, mostly

amorphous, were obtained when deposition temperatures were below 350 ◦C. However, for

temperatures higher than 400 ◦C, the films became polycrystalline, presenting the HfO2

monoclinic phase. Scanning electron microscopy of the films revealed a rough surface

morphology with spherical particles. Also, electron energy dispersive analysis was performed

on these films. The photoluminescence and cathodoluminescence characteristics of the

HfO2 : SmCl3 films, measured at room temperature, exhibited four main bands centred at 570,

610, 652 and 716 nm, which are due to the well-known intra-4f transitions of the Sm3+ ion. It

was found that the overall emission intensity rose as the deposition temperature was increased.

Furthermore, a concentration quenching of the luminescence intensity was also observed.