

Synthesis of Y₂O₃ Films by Spray Coating with Milled EDTA–Y–H Complexes

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Abstract : Yttrium oxide (Y₂O₃) films have been successfully deposited with yttrium-ethylenediaminetetraacetic acid (EDTA–Y–H) complexes prepared by various milling techniques. The effects of the properties of the EDTA–Y–H complex on the properties of the deposited Y₂O₃ films have been analyzed. Seven different types of the raw EDTA–Y–H complexes were prepared by various commercial milling techniques such as ball milling, hammer milling, commercial milling, and mortar milling. The milled EDTA–Y–H complexes exhibited various particle sizes and distributions, depending on the milling method. Furthermore, we analyzed the crystal structure, morphology and elemental distribution profile of the metal oxide films deposited on stainless steel substrate with the milled EDTA–Y–H complexes. Depending on the milling technique, the flow properties of the raw powders differed. The X-ray diffraction pattern of all the samples revealed the formation of Y₂O₃ crystalline phase, irrespective of the milling technique. Of all the different milling techniques, the hammer milling technique is considered suitable for fabricating dense Y₂O₃ films.

Keywords : powder sizes and distributions, flame spray coating techniques, Yttrium oxide

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