THICK FILMS OF ELECTROCERAMICS BY ELECTROPHORETIC DEPOSITION: ON THE WAY TO DEVICES

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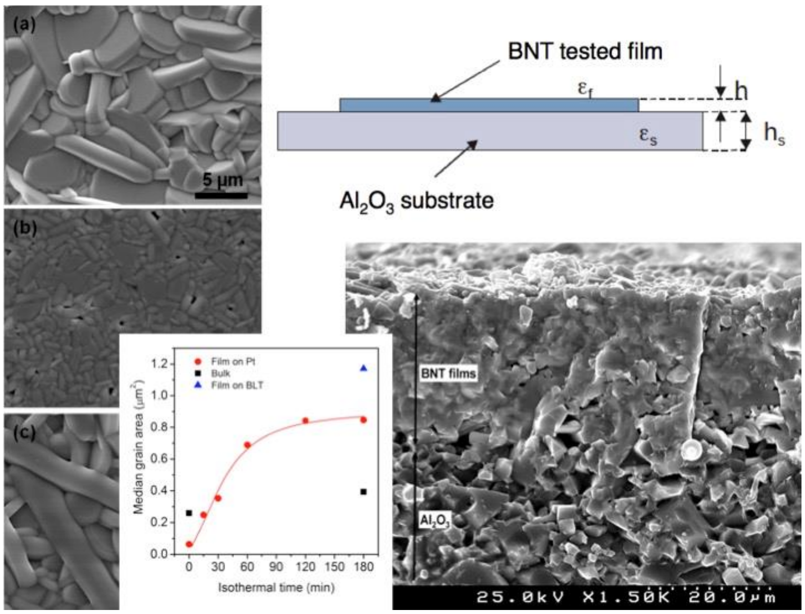
Electroceramics enable currently many important electronic and electro-optic devices. The applications are innumerous, ranging from capacitors, nonvolatile memories, pyroelectric sensors, surface acoustic wave (SAW) substrates, optical waveguides and optical memories and displays, semiconductor memories, piezoelectric actuators and sensors, microwave dielectrics, soft magnets and hardmagnets, among many others. The market is also large. The advanced ceramics market that includes ceramics for electrical and electronics, medical and bio-medical, transportation, industrial machinery, environmental, chemical, and defense and security, is predicted to be $9.5 billion by 2020. The electronics industry is one of the largest end-user industries of advanced ceramics with a share of more than 40% of the total market size (*MarketsandMarkets, January 2017*). To respond to the current societal needs electronics must be low cost, small, portable, connectable, flexible and compatible. Applications of electroceramic films are then ubiquitous. We believe that among the most versatile, low cost and sustainable processes to fabricate electroceramic films is Electrophoretic Deposition (EPD).



Within this context we have been exploiting EPD for the fabrication of some important electroceramics as: $PbZr_{1-x}Ti_xO_3$, $BaNd_2Ti_5O_{14}$, $BaLa_4Ti_4O_{15}$, $TiTe_3O_8$, Cu_3TeO_6, $K_{0.5}Na_{0.5}NbO_3$, $SrTiO_3$, $Sr_4Nd_2Ti_4Nb_6O_{30}$ and SnO_2. In this talk we will summarize our most relevant contribution to the field and the lessons learned. From the understating of the suspension chemistry, including issues like lixiviation and suspension stability dependence on particles morphology, to the opportunity that constrained sintering imposed from the substrate is in terms of final electrical properties, through the development of alternative processes that permit to overcome EPD limitation of conducting substrates to the proof of device concept, we will advocate that EPD is a viable and promising method for the fabrication of thick functional electroceramic films.

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