# ADVANCES IN THE DEPOSITION OF CERAMICS BY SOFT CHEMISTRY PROCESS: EXAMPLE OF RARE-EARTH SILICATE COATINGS

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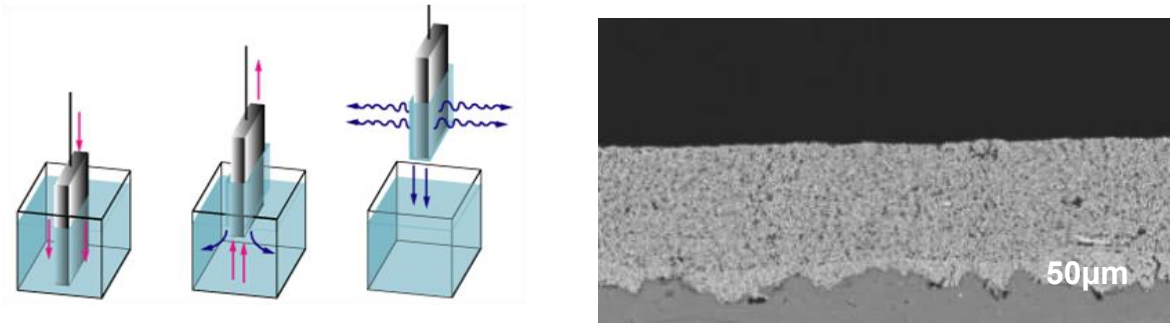
The dip-coating process consists in immersing a sample to be coated in the liquid medium and then removing it at a controlled speed in order to obtain a film of regular thickness, as shown in Figure 1a). Dip-coating technique is now used in many industrial fields (biomedical, transportation, optics…). It is a very simple, and easy process to implement for the deposition and shaping of different natures of coatings (ceramic, metallic and polymer). In the case of ceramic coatings, after the dip-coating operation, the layers undergo a sintering post-treatment leading to the consolidation and/or the densification of the deposit. The corresponding mechanisms need a rigorous control of many parameters. The parameters involved in the dip-coating process are related to the medium and to the process. Concerning the medium, the dispersion medium nature, the particles concentration, viscosity, and stability are the main ones. The stability of the suspension is a first-order parameter and a preliminary formulation work has been carried out to cope with it. Moreover, parameters relative to the fabrication process such as the number of layers and the thermal profile (intermediary and final temperatures), will also be key factors to be taken into account in the formation of homogeneous and reproducible coatings by dip-coating.This work highlights the influence of these various parameters in the case of rare earth silicates based coatings. The various experiments were carried out in correlation to the coatings quality and microstructure. Homogeneous and conformal ceramic coatings of few tens of micrometers thick, as shown in Figure 1b), were obtained. A multi-layers deposit in a sol loaded at 40% mass generally allows to reach the desired thickness. With these experiments relationship between dip-coating parameters and coatings microstructure and morphology can be established.




a) b)

*Figure 1: a) Schematic illustration of dip-coating process, b) SEM image of the cross-section of silicate based ceramic coating obtained by dip-coating"*