

Complementary analysis techniques applied on optimizing suspensions of yttria stabilized zirconia - DTU Orbit (09/11/2017)

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Three different polymers with different functional groups and similar molecular weight were tested as dispersing agents for suspensions of yttria stabilized zirconia in ethanol: polyvinyl pyrrolidone, polyethylene imine, polyvinyl butyral/acetate. The stability of the system was assessed considering, in details, all the processing steps, including suspension de-agglomeration, slurry manipulation, quality of sintered tapes microstructure, and final layer leak tightness. Different analytical techniques were used to monitor ceramic de-agglomeration and stability as a function of time, for different types of dispersing agent and to optimize the dispersants concentration: Electrokinetic Sonic Amplitude was used to obtain zeta potential, Multiple Light Scattering for evaluating sedimentation rate, and multi-wavelength laser light scattering for measuring particle size distribution. All the results agree upon excellent performance of polyvinyl pyrrolidone and polyethylene imine as dispersing agents. The stability and dispersing power were finally utilized for preparing concentrated suspensions for tape casting and subsequently to sinter the tapes into dense ceramic pieces.

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