

## Particle migration using local variation of the viscosity (LVOV) model in flow of a non-Newtonian fluid for ceramic tape casting - DTU Orbit (09/11/2017)

### Particle migration using local variation of the viscosity (LVOV) model in flow of a non-Newtonian fluid for ceramic tape casting

In this paper, the migration of secondary particles in a non-Newtonian ceramic slurry in the tape casting process is investigated with the purpose of understanding the particle distribution patterns along the casting direction. The Ostwald-de Waele power law model for the non-Newtonian flow behaviour is assumed in the simulation of the ceramic slurry flow. A local variation of the viscosity (LVOV) model as a function of the particle volume fraction is introduced and taken into account in the advection and the settling of the particles in the flow field. The results show that using the LVOV model changes the particle distribution pattern from being a constant distribution to a semi-layered one. The presence of such layered structure is highly affecting the subsequent sintering process, which in turn causes anisotropic shrinkage of the dried tapes. Moreover, it is found that increasing the substrate velocity (casting speed) leads to a more uniform distribution of the particles inside the ceramic slurry, in which case the shear induced particle migration is dominating over the gravity induced one.

#### General information

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