

Optimization of the mixing/grinding of MgO+TiO₂ powders for MgTiO₃ solid state synthesis

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Abstract:

Through the dielectric materials used for the making of type I multilayer ceramic capacitors, the ilmenite magnesium titanate MgTiO₃ is of particular importance. Yet, it seems difficult to get pure MgTiO₃ with a controlled stoichiometry. In order to be able to synthesize it by solid state reaction, we therefore studied the mixing/grinding behavior of the precursors MgO + TiO₂.

The evolution versus pH of the zeta potential values of both MgO and TiO₂ (anatase) powders shows that it is impossible to get correct pH values allowing a good dispersion state and thus an easy control of the mixing of these two species when considering only electrostatic repulsion. So, we considered to add dispersants in order to get a steric dispersion behavior. Rheological characterization of the slurries showed that we were able to get a good dispersion state allowing after calcination the obtaining of pure magnesium titanate with a controlled stoichiometry.