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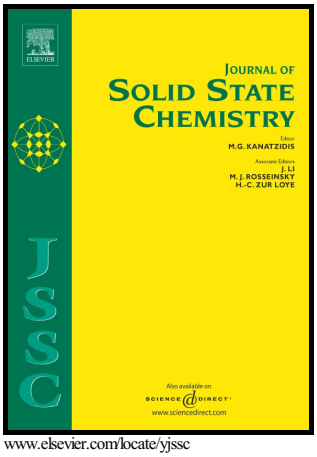

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Abstract

This paper reports the preparation of Ti microparticles that are angular and spherical in shape through the combustion of a TiO_2+αCa (where α is moles of Ca) exothermic mixture in an inert atmosphere. The relationship between the combustion parameters and the properties of the resultant Ti particles is discussed with consideration of the effect of Ca concentration. Using excess amounts of Ca in the experiment was effective in modifying the shape of the particles from angular to spherical. The Ti powder was found to be well-dispersed and the diameter of individual particles ranged from 5 μm to 50 μm. Based on the combustion parameters, the activation energy for the redox reaction was calculated as ~138 kJ/mol. This paper discusses the chemistry of the reduction process and highlights the effects of combustion temperature and the amount of liquid calcium on the characteristics of the Ti particles.

Graphical abstract