Effect of Milling Duration on powder characterization of (TiO2, and graphite).

Abstract

In this work, the effect of milling duration on powder characterization of (TiO2, and C) has been studied. Initial stoichiometric mixtures of TiO2 and graphite powders were mechanically activated by ball milling at a constant rotational speed of 400 rpm and BPR with different durations, namely 30 h, 50 h, 70 h, and 90 hours. Then the mechanically activated powder was heat treated in an argon atmosphere at temperatures of 1100 o C, 1200 o C, and 1300 o C. The as-milled and heat treated powders were characterized by using X-ray Diffraction (XRD), Scanning Electron Microscope (SEM), and Brunauer, Emmett, Teller (BET) techniques. In mixtures of TiO2 and graphite, the average particle size increased whereas the density, specific surface area, and average crystallite size for the samples decreased with increase in milling time. After heat treatment of the as milled powder mixtures of TiO2 and C, the lattice strain decreased due to release of the strain, whereas the density, average crystallite size, and specific surface area increased compared to the samples before heat treatment at the same milling duration due to phase transformation and chemical reaction, grain growth, and decrease in agglomeration.

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