

Physical and optical properties of nanocrystalline calcium ferrite synthesized by the polymerized complex method

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Nanocrystalline CaFe_2O_4 oxide semiconductor with spinel structure was synthesized by polymerized complex (PC) method and investigated for its physical and optical properties. The crystallization of CaFe_2O_4 made by PC method was found to occur in the temperature range of 700–1100°C. The observation of highly pure phase and such lower crystallization temperature in CaFe_2O_4 made by PC method, is in total contrast to that observed in CaFe_2O_4 prepared by the conventional solid-state reaction (SSR) method. The activation energy required for the growth of nanocrystalline CaFe_2O_4 in PC sample was found to be 8.4 kJ/mol. The band gap of nanocrystalline CaFe_2O_4 determined by UV-DRS was 1.91 eV (647nm). The photocatalytic activity of PC materials for iso-propyl alcohol photodegradation under visible light ($\lambda \geq 420\text{nm}$) was much higher than that of SSR materials.