Catalytic activity of doped SrFeO3- perovskite-type oxide ceramics for degradation of water pollu-tants

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Catalytic activity of doped SrFeO3-δ perovskite-type oxide ceramics for degradation of water pollutants

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Due to the global increase of water pollution, the interest in the use of high efficiency and environmentally friendly technologies for water purification has been growing. Such methodologies must also be characterized by low cost and low energy consumption. In recent years, finding a proper method of removal of contaminants of emerging concerns (CECs) is becoming a priority, as their presence has been recognized as a major risk for human, wildlife and the environment [1]. Among different methods, degradation of water pollutant using catalytic properties of perovskites [2],[3],[4] is becoming nowadays significant area of interest. This is mainly due to its property of •OH radicals generation participating in abatement of organic pollutants [5], [6]. Moreover, perovskite oxides are synthesized by solution combustion synthesis (SCS) which is a fast process, which yields powders with high purity and high porosity [7].

In this work the perovskite-type cerium-doped strontium ferrite $Sr_{0.85}Ce_{0.15}FeO_{3-\delta}$ (SCF) was synthesized by solution combustion synthesis from citric acid. The purpose in this study was to investigate thermo-catalytic properties of this perovskite for the degradation of Bisphenol A and other model CECs. Structure of perovskite material was characterized by X-ray diffraction, for morphology by high-resolution transmission electron microscopy (HRTEM) and scanning electron microscope (SEM). Surface area was measured by Brunauer-Emmett-Teller (BET) analysis and surface charge was investigated by zeta potential measurements. In order to determine degradation of contaminants in different temperatures, samples were collected in specified time ranges and analysed by high-performance liquid chromatography (HPLC). Experimental results indicated that a significantly higher catalytic activity of $Sr_{0.85}Ce_{0.15}FeO_{3-\delta}$ was observed with increase of temperature. The present study reveals that this ceramic catalyst can be a promising material for the effective removal of contaminants for water purification application.

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