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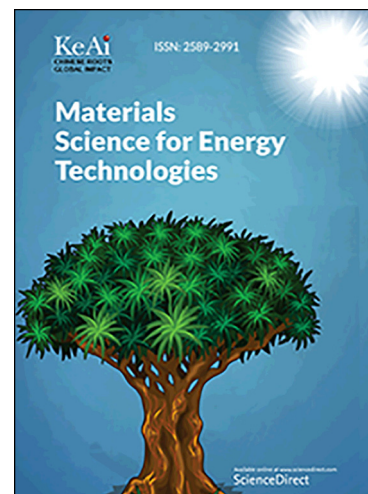
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Catalytic soot oxidation activity of Cr-doped Ceria ($\text{Ce}_{1-x}\text{Cr}_x\text{O}_{2-\delta}$) synthesized by sol-gel method with organic additives

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Abstract

Cr-doped ceria catalysts ($\text{Ce}_{1-x}\text{Cr}_x\text{O}_{2-\delta}$: $x=0.05$ to 0.25) were prepared by sol-gel synthesis using glucose and fructose as organic additives. The structural and morphological properties were investigated by XRD, BET surface area, Raman and SEM analysis. Catalytic soot oxidation activity of the samples was analyzed by thermogravimetric analysis. XRD results established the evidence for the formation of $\text{Ce}_{1-x}\text{Cr}_x\text{O}_{2-\delta}$ solid solutions and Cr_2O_3 formation had taken place when the dopant level is $x \geq 0.15$. Pure ceria possessed higher surface area when compared to Cr-doped samples due to agglomeration as evidenced by SEM analysis. Raman analysis proved the formation of fluorite phase and also oxygen vacancies. Among the synthesized catalysts pure and Cr-doped exhibited superior catalytic activities when compared to uncatalysed soot. These materials can be used for fabricating effective DPF regeneration systems which require lesser energy consumption.

Keywords: $\text{Ce}_{1-x}\text{Cr}_x\text{O}_{2-\delta}$, Oxygen vacancies, Soot Oxidation.

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