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**Self-propagating High-temperature Synthesis of  
Oxide Solid Solutions  $\text{Al}_2\text{O}_3/\text{Cr}_2\text{O}_3/\text{Fe}_2\text{O}_3$**

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**ABSTRACT**

Characteristics of pressurized self-propagating high-temperature synthesis during combustion of a thermite-type mixture ( $\text{Fe}_2\text{O}_3/\text{Al}$ ) +  $\gamma\text{Cr}_2\text{O}_3$ ) was studied. The limits of liquid-phase combustion and oxide and metallic phase separation in the final products were determined. The formation of the microstructure, chemical and phase compositions of cast corundum-based oxide materials was studied. It was found that chromium oxide is low-active in redox reactions with aluminum and mainly participates in the formation of an oxide consisting of two phases: (A) a solid solution of  $\text{Cr}_2\text{O}_3$  in  $\text{Al}_2\text{O}_3$  and (B) spinel  $\text{FeO-Al}_2\text{O}_3(\text{Cr}_2\text{O}_3)$ . Depending on the  $\text{Cr}_2\text{O}_3$  content in the green mixture the A/B ratio may change along with their chemical and phase compositions. However, the metallic ingot microstructure and composition remain practically unchanged.