Thermal Imaging Studies of the SHS Preparation of MgFe$_2$O$_4$

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ABSTRACT

Rapid capture thermal images have been recorded for the self-propagating high-temperature synthesis (SHS) preparation of MgFe$_2$O$_4$. As the SHS wave moved through the bulk of a prepared pellet consisting of a mixture of Fe, Fe$_2$O$_3$, MgO, and NaClO$_4$, images were captured in real time. Reaction temperatures in excess of 1265°C were observed, and a propagation wave with Gaussian-like isothermal properties was observed to move through the bulk of the pellet. Surface heat islands were also observed, probably resulting from inhomogeneities in the green mixture.