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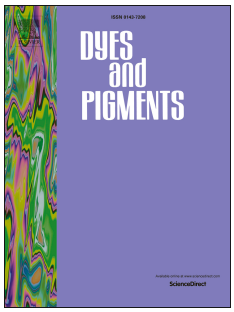

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One-step synthesis of near-infrared reflective brown pigments based on iron-doped lanthanum aluminate, $LaAl_{1-x}Fe_xO_3$

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Abstract

The paper explores the perspective of using an urea and glycine fuel mixture in order to obtain brown, heat reflective iron-doped lanthanum aluminate $LaAl_{1-x}Fe_xO_3$ (x = 0, 0.25, 0.5, 0.75) pigments, directly from the combustion reaction. The exothermic redox reactions were characterized by high combustion temperatures, ranging between 1712 °C (x = 0) and 1017 °C (x = 0.75), which facilitated the formation of perovskite solid solutions within a very short period of time, no further annealing needed. The crystallite size, specific surface area, colour and total solar reflectance of the pigments depend on the substitution degree of Al^{3+} by Fe^{3+}. The increase of Fe^{3+} content resulted in