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One-step synthesis of near-infrared reflective brown pigments based on iron-doped lanthanum aluminate,  $\text{LaAl}_{1-x}\text{Fe}_x\text{O}_3$

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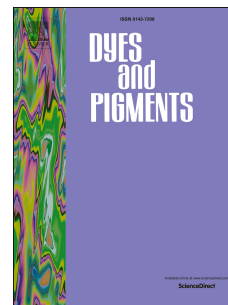
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# One-step synthesis of near-infrared reflective brown pigments based on iron-doped lanthanum aluminate, $\text{LaAl}_{1-x}\text{Fe}_x\text{O}_3$

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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  $\text{LaAl}_{1-x}\text{Fe}_x\text{O}_3$  ( $x = 0, 0.25, 0.5, 0.75$ ) 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  $\text{Al}^{3+}$  by  $\text{Fe}^{3+}$ . The increase of  $\text{Fe}^{3+}$  content resulted in

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