

Accepted Manuscript

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PII: S1385-8947(18)31666-8
DOI: <https://doi.org/10.1016/j.cej.2018.08.192>
Reference: CEJ 19806

To appear in: *Chemical Engineering Journal*

Received Date: 30 May 2018
Revised Date: 3 August 2018
Accepted Date: 27 August 2018



Please cite this article as: J. Miao, X. Duan, J. Li, J. Dai, B. Liu, S. Wang, W. Zhou, Z. Shao, Boosting performance of lanthanide magnetism perovskite for advanced oxidation through lattice doping with catalytically inert element, *Chemical Engineering Journal* (2018), doi: <https://doi.org/10.1016/j.cej.2018.08.192>

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Boosting performance of lanthanide magnetism perovskite for advanced oxidation through lattice doping with catalytically inert element

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Abstract

ABO₃-type perovskite oxides, characterized by high structural flexibility, have found potential applications in many redox processes, including as catalysts for advanced oxidation in wastewater remediation. Here, we demonstrated that by doping the generally believed catalytically inert A-site of LaMnO₃ (LMO) perovskite with strontium, the catalytic performance for advanced oxidation is surprisingly boosted. Specifically, La_{0.4}Sr_{0.6}MnO_{3-δ} (LSMO46) was designed which exhibited a high specific activity (0.0608 min⁻¹ m⁻²) for peroxydisulfate (PDS) activation, ~6 times that of LMO and ~41 times that of reported nanosized MnFe₂O₄ and Fe/Fe₃C. The superior activity was also embodied by low activation energy (44.3 kJ mol⁻¹).

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