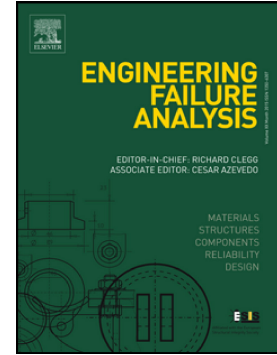


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## Cyclic oxidation resistance of ferritic stainless steels used in mufflers of automobiles

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### Abstract

This work investigates the cyclic oxidation resistance of AISI 439 and AISI 441 ferritic stainless steels (FSS) at a typical temperature of muffler (300°C). This temperature is characteristic of the cold exhaust of an automobile. The oxidation testing of steels was performed in synthetic air in a tube furnace under two different conditions: after immersing in the synthetic condensed (TOC) for 10 h and without immersion in the synthetic condensed (TOP). The mass gain of AISI 439 steel without previous immersion in condensate was the half of the mass gain of AISI 439 steel oxidized after immersion in condensate. In all samples, the Fe<sub>2</sub>O<sub>3</sub> was only identified in the oxide layer on samples that oxidized after immersion in a condensate solution. The corrosion perforation of mufflers is mostly attributed to the cyclic and synergetic effect of oxidation and condensation processes of hot moisture-bearing exhaust gas.

**Keywords:** Hot corrosion; Oxidation; X-ray analysis; Vehicle failures

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