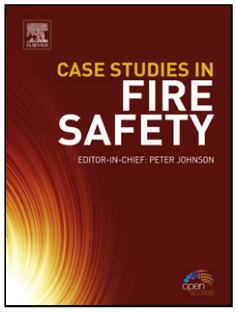

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Multifunctional inhibition based on layered double hydroxides to comprehensively control corrosion of carbon steel in concrete

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Highlights

- A novel multifunctional inhibitor of MgAl-layered double hydroxides (LDHs) loaded with nitrite anions was synthesized successfully for corrosion control of steel in concrete.
- The synthesized nitrite anions loaded LDHs are able to provide a comprehensive and efficient protection for steel in concrete.
- A conceptual model was proposed for further understanding of the corrosion protection mechanism of such multifunctional inhibitor for steel reinforced concrete.

Abstract: A novel multifunctional inhibitor of MgAl-layered double hydroxides (LDHs) loaded with nitrite anions was synthesized via a calcination-rehydration in ambient atmosphere without inert gas protection. It was demonstrated that such LDHs loaded with inhibitor was able to efficiently control the corrosion of carbon steel in simulated carbonated concrete pore (SCCP) solution as well as in mortar. Based on the systematic measurements, a conceptual model was proposed to further understand the mechanism of multifunctional corrosion protection of MgAl-LDHs-NO_2^- in steel reinforced concrete. Such unique multifunctional composite is markedly helpful to comprehensively control corrosion of steel in concrete.

Key words:
A. Steel reinforced concrete
A. Layered double hydroxides
C. Corrosion protection
C. Multifunctional inhibitor
C. Mechanism