

## 8、 Intelligent Corrosion Control

### Co-Al hydrotalcite assembled nanofibers to enhance corrosion inhibition and effective Cl<sup>-</sup> adsorption for long-term corrosion protection

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**Abstract** To enhance corrosion resistance and extend the service life of coatings, layered double hydroxides (LDH) have been embedded into coatings to create a hybrid of organic-inorganic micro/nano-containers, improving the coatings' physical barrier properties. Herein, an elaborately designed strategy is proposed to in-situ grow LDH on nanofibers, thereby obtaining polyvinylidene difluoride/hydrotalcite@deprotonated benzotriazole (PVDF/LDH@BTA<sup>-</sup>) composite nanofibers, followed by incorporation into an epoxy resin to formulate the composite coating. The even distribution of LDH within the coating, aided by nanofibers, significantly bolstered the coating's barrier effect. Upon exposure to corrosive environments, the hydrotalcite structure within PVDF/LDH@BTA<sup>-</sup> adsorbs chloride ions through anion exchange, capturing up to 0.26 mmol/cm<sup>2</sup> of chloride ions. Concurrently, corrosion inhibitors were released, forming a protective layer on the copper surface to substantially mitigate the corrosion process. This innovative approach markedly enhances the composite coating's long-term corrosion resistance.

**Keywords:** Layered double hydroxide; Electrospinning; Active corrosion inhibition; Anion-exchange; Chloride ion adsorption