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Fast decolorization of azo dyes in both alkaline and acidic solutions by Al-based metallic glasses

Peipei Wang, Jun-Qiang Wang, He Li, Hao Yang, Juntao Huo, Jianguo Wang, Chuntao Chang, Xinmin Wang, Run-Wei Li, Gang Wang

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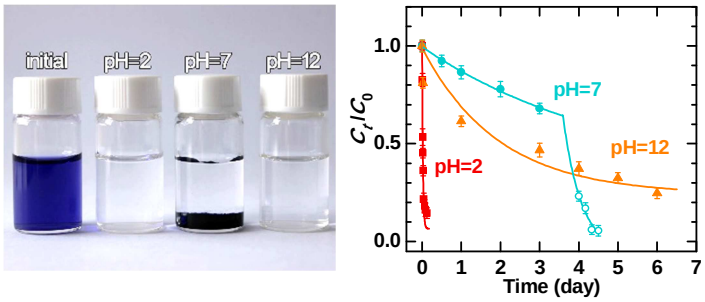
Graphical abstract



Al-based metallic glasses can degrade azo dyes fast in alkaline and acidic solutions. The positively charged $[Al_m(OH)_n]^{(3m-n)+}$ colloid particles precipitate at the second reaction stage in neutral solution and exhibit excellent adsorption ability to azo dye molecules, which can also decolorize the solution quickly and completely. The reaction activity can be further enhanced by modifying the alloy composition. Further investigation verifies that the lower reaction activation energy and formation of nano-porosity on the surface of metallic glass are responsible for the fast decolorization in alkaline and acidic solutions. These findings suggest that the Al-based metallic glasses hold promising potential in degrading azo dyes solutions, especially in alkaline and acidic environments.

Keyword: Al-based metallic glass, decolorization, azo dye, alkaline solution, nano-porous.

Peipei Wang, Jun-Qiang Wang*, Hao Yang, Wei Xu, Juntao Huo, Jianguo Wang, Chuntao Chang, Xinmin Wang, Run-Wei Li, Gang Wang*