Removal of Microplastics by Waste Plastics Based on Fenton-like Reaction: Waste Treat Waste

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Microplastics have become one of the new pollutants which have aroused international concern, and they even pose a potential threat to human health. In this project, a classical Fenton-like reaction was used to prepare carbon-based catalysts from waste plastics to treat microplastics. The research contents include carbonization of waste plastics by high-temperature carbonization method, preparation of carbon-based catalysts by loading Fe_3O_4 nanoparticles on their surfaces, characterization and analysis of the surface morphology and element distribution of carbon materials and catalysts by exploring the effect of acidification pretreatment on the magnetic properties of catalysts, and further exploring the effect of removing microplastics by Fenton-like reaction system under different conditions. The results show that the high-temperature carbonization method can convert waste plastics into carbon materials and the acidification pretreatment can help to improve the yield of the magnetic catalyst for subsequent recycling. It is also found that the reaction time is extended to 11 hours and the weight loss rate can reach 22.5%. The above results illustrate the feasibility of this project, and provide new ideas for the treatment of a series of microplastics and carbon-containing wastes, including plastics, coffee grounds, dried fruit shells, etc., and can be extended to various systems such as Light-fenton, so as to truly realize “waste treat waste”.

Awards Won:

Fourth Award of $500