Enhanced Atrazine Removal from Water by Ordered Mesoporous Carbons

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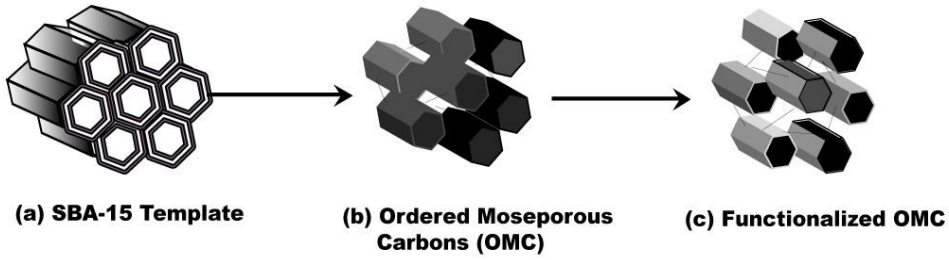
Atrazine, a 2-chloro-s-triazine family of herbicides, is the top herbicide widely used in United States for crop production. Due to the widespread application in agricultural lands and watersheds, the presence of atrazine in surface and groundwater is frequently detected. A recent survey conducted by EPA revealed that there were four watersheds in the Midwest, two in Missouri, that have been identified to contain significantly elevated atrazine in surface and ground water, and the contamination could be of environmental health concerns. Atrazine could act as an endocrine disrupting compound (EDC) having adverse effects on the central nervous system, the endocrine system, and the immune system. In order to reduce human exposure to atrazine, the reduction of atrazine concentration in drinking water to meet the EPA MCL requirement through effective water treatment would be a challenge and critical for protecting human health from the contamination.

This research is to aim at developing an innovative carbon-based absorbent enable to more effectively remove atrazine from water than conventional absorbents through enhanced adsorption mechanisms. Specific research tasks include: (i) synthesize high surface area, ordered mesoporous-structured carbon materials (OMC); (ii) functionalize the OMC surface with attachment of selective groups (ligands) (FOMC); and (iii) evaluate the atrazine removal efficiency of both OMC and FOMC and optimize conditions for a maximum adsorption.



An illustrative model of OMC synthesis, (a) silica template SBA-15, (b) derived OMC, and (c) FOMC