

Scientists use tobacco waste liquid and waste iron residue for Cd(II) removal

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Schematic diagram of the fabrication process and the adsorption mechanisms of OWIR@TWL@SP. Credit: WU Qingchuan

According to a new study published in *Langmuir*, a kind of iron-based carbon microsphere was successfully prepared from tobacco waste liquid (TWL) and waste iron residue (WIR) to remove Cadmium ion (Cd(II)) from water and soil.

This research was conducted by researchers led by Prof. Wu Zhengyan from the Hefei Institutes of Physical Science (HFIPS) of the Chinese Academy of Sciences.

Non-nutritive metal has been considered harmful to the environment and humans. With the rapid development of the metallurgy, electroplating, pigment, mining, and battery industries, cadmium pollution is becoming

increasingly serious. About 30,000 tons of TWL is released to the environment each year, resulting in severe pollution.

The researchers tried to reuse two waste products in this study. They named the novel magnetic iron-based carbon microsphere as WIR@TWL.

To improve the [stability](#) and increase active groups of WIR@TWL particle, the researchers coated the magic microsphere with sodium polyacrylate to form WIR@TWL@SP. They used this method to improve Cd(II) removal efficiency as the hydrochar was stable the WIR surface and the carboxyl group was modified on the surface of WIR@TWL@SP.

Cation-exchange, electrostatic attraction, hydrogen-bond interaction, and cation- π interaction were also included in the removal mechanisms.

Co-hydrothermal treatment was also an innovation, and no one used this method to fabricate WIR@TWL before, according to the researchers.

More information: Qingchuan Wu et al, Synthesis of Iron-Based Carbon Microspheres with Tobacco Waste Liquid and Waste Iron Residue for Cd(II) Removal from Water and Soil, *Langmuir* (2022). [DOI: 10.1021/acs.langmuir.2c00125](https://doi.org/10.1021/acs.langmuir.2c00125)

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