MS30-2-10 Efficient eco-friendly metal organic framework for amoxycilline degradation from aqueous solution #MS30-2-10

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Abstract
Due to the scarcity of water and the growing industrialization, pharmaceutical wastewater treatment is of particular importance. Today's pharmaceutical residuals are suggested as an overgrowing portion of the emerging pollutants because of their broad usage. Antibiotics such as amoxicillin (AMX) are commonly found in the wastewater, reaching the environment through urine and excreta and one of the most known effects on the environment is the development of resistant pathogenic bacteria. Amoxicillin is an antibiotic of the betalactam family. This class of antibiotics interferes with the synthesis of the cell wall of bacteria by inhibiting the transpeptidase, an enzyme essential for the formation of peptidoglycan. Amoxicillin is characterized by chemical stability, low rate of biodegradation and high level of toxicity. It has been widely used in veterinary medicine to prevent various bacterial infections of the livestock due to their broad spectrum and lesser side effects used for disease treatment. To a lesser extent, it is used for the treatment of human infections.
For this reason, it is necessary to achieve an efficient method to eliminate this pollutant.[1] Metal−organic framework (MOFs) as a new class of nanoporous materials, due to their rich host-guest chemistry, has displayed high efficiency in various fields especially in the adsorption process. [2,3]
Taking the abovementioned into account, current work aimed to prepare, and evaluate the efficacy of of an eco- and bio-compatible water wastewater treatment as adsorbent for the removal of AMX from aqueous solutions. This novel MOF $(Ca^{II}Zn^{II}_6[(S,S)$- Mecysmox$]_3(OH)_2(H_2O)\}\cdot 15H_2O$ (1), is characterized by functional channels decorated with CH_2SCH_3 thioalkyl chain from L-methylcysteine amino acid-derived ligand (Figure 1). In this contribution its adsorption capacity, reusability and surprisingly its catalytic activity, in mild conditions, in degradation of AMX to penicilloic acid will be described. This combination of outstanding efficiency with low-cost straightforward synthesis places this material among the most promising adsorbents reported for the removal and degradation of this type of contaminants.

References
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View of the porous crystal structure of 1