Title	**Diazotization-coupling reaction on aluminum-based metal–organic framework for efficient purification of wastewater from carbofuran pesticide.**

Abstract

A crucial issue is the development of highly and selectively absorbable pesticides. At room temperature, aluminum-based metal–organic frameworks (MIL-53-NH_2, MIL-53-AZA, MIL-53-AZA-La, and MIL-53-AZA-Ce) were successfully formed.

The structure of the compounds was proven using various analyses, such as FTIR, ^{1}HNMR, X-ray diffraction (XRD), and scanning electron microscopy (SEM). FTIR spectra proved that there was a shift in the values of the functional groups, which confirmed the formation of the new compounds. The X-ray confirmed that there was no deformation in the structure of the new compounds, as they showed the same spectral bands as pristine MOF, which confirmed that there was no distortion in the main MOF structure. ^{1}HNMR analysis of the modified MOF confirmed the presence of two isomers (Syn-Diazo and Anti-Diazo).

Using prepared MOFs as sorbents, carbofuran was adsorbed from wastewater. Experimental and spectroscopic studies were used to investigate the elimination mechanisms. The current process can connect a mixture of pi- pi stacking contact, coordination bonding, and hydrogen bond production. The adsorption of carbofuran from wastewater was best described by pseudo-second-order kinetics and Langmuir isothermal models. MIL-53-NH_2, MIL-53-AZA, MIL-53-AZA-Ce, and MIL-53-AZA-La had elimination capacities of 367.87, 433.50, 610.23, and 635.16 mg g^{-1}, respectively. The synthesized MOFs are represented as promising materials for the removal of carbofuran. The current study proposes an ideal approach for the removal of carbofuran from wastewater, assuming that the framework has a free lanthanide center that facilitates coordination bonding with carbofuran insecticide.