

Publication

Synthesis and crystal structure of Cd-based metal-organic framework for removal of methyl-orange from aqueous solution

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4220257**Author(s)** Tella, Adedibu C.; Olawale, Margaret D.; Neuburger, Markus; Obaleye, Joshua**Author(s) at UniBasel** [Neuburger, Markus](#) ;**Year** 2017**Year: comment** 2017**Title** Synthesis and crystal structure of Cd-based metal-organic framework for removal of methyl-orange from aqueous solution**Journal** Journal of Solid State Chemistry**Volume** 255**Pages / Article-Number** 157-166

A novel $[\text{Cd}(\text{INA})_2(\text{H}_2\text{O})]$. ISB (1) (INA = isonicotinate; ISB = isobutanol) was synthesized through the reaction between the isonicotinic acid ligand and cadmium (II) salt and characterized by elemental analysis, FTIR and UV-Visible spectroscopies, SEM and Single crystal X-ray diffraction. The crystal is orthorhombic, space group Pbca , $a = 12.24(10) \text{ \AA}$, $b = 15.4646(13) \text{ \AA}$, $c = 18.8445(17) \text{ \AA}$, $V = 3569(3) \text{ \AA}^3$, $Z = 8$. The pentagonal bipyramid (seven coordinate) around the cadmium (II) ion is of the form CdN_2O_5 coordinating to four oxygen atoms from carboxylates, one oxygen atom from water molecule and two nitrogen atoms of pyridine. The structure of compound is stabilized by two hydrogen bonds namely intermolecular (O-H-O) and intramolecular type C-H-O accounting for polymeric nature of the metal-organic frameworks. 1 was studied for adsorptive removal of methyl orange (MO) from aqueous solution. Equilibrium isotherm study reveals that Langmuir model gave a better fitting result than the Freundlich model. The pseudo-second order model could be used to interpret adsorption kinetics. The maximum adsorption capacity calculated by Langmuir was 166 mg/g at 300 K. These results indicate the adsorption of MO on 1 is partly due to electrostatic interaction between methyl orange and the adsorbent. 1 could be used as adsorbent to remove methyl orange from aqueous solution.

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