
Green route synthesis of Cu(II) AND Zn(II) Carboxylate Metal-Organic Frameworks (MOFs) and their applications for loading of urea and ibuprofen drugs

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Green route synthesis using mechanochemical method was used to synthesize [Cu(INA)₂][1] and [Zn(fum)(H₂O)₂][2] MOFs. These compounds were characterized using melting point, elemental analysis, UV-Vis and FT-IR Spectroscopies and XPRD. The MOFs were investigated for the loading of Ibuprofen and Urea respectively based on their porosities for better drug interaction and high loading. Zinc-fumarate [Zn(fum)(H₂O)₂] exhibits a very high drug loading capacities of 98wt% of Ibuprofen while Copper-isonicotinate [Cu(INA)₂] exhibits a slightly high drug loading capacities of 44wt% of Urea. The ability of [Zn(fum)(H₂O)₂] to load Ibuprofen was compared with those of MOFs reported in literature. [Zn(fum)(H₂O)₂] proved to be a better drug carrier compare to others. Their loading capacity increases in order of 0.347 < 1.334 < 1.376 < 2.950 corresponding to MIL-100 < Zn-BDC < MIL-101 < [Zn(fum)(H₂O)₂]. These were attributed to high porosity of MOFs as well as their internal microenvironment well adapted to the character of the drugs. This work reveals the potential of MOFs materials as promising candidates for drug loading.