Title:	Synthesis, Characterization, Physicochemical Properties and Sensing Application of Lanthanide-based Metal Organic Frameworks
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Abstract:	In the last few decades, Lanthanide coordination compounds have been of intense interest for their practical applications in sensing, radioactive labelling, time resolved fluoroimmunoassays, bio-imaging, etc. Modulation of their characteristic luminescence is the key to these applications. Lanthanide ions are sensitized via an “antenna effect” through the coordination of N/O donor ligands acting as chromophores to obtain highly intense luminescence from the Lanthanide centre, which normally show Laporte forbidden f-f transitions with low intensity emission bands. In this work, a pyridine-carboxylate based ligand such as potassium 2,2'-(butane-1,4-diylbis((pyridin-2-ylmethyl)azanediyl))diacetate (K2bpbd), which is prepared in high yield and spectroscopically characterized, has been utilized to make nine new lanthanide complexes namely, {[Ln(bpbd)(H2O)2(X)].y(H2O)}n, where Ln = La (1, 6 and 7), Nd (2, 8 and 9), Sm (3), Tb (4) and Dy (5); X- = NO3 - (1, 2, 3, 4 and 5), OAc- (6 and 8), Cl- (7) and ClO4 - (9); y = 7 for 1, 2, 3 and 8 and = 5 for 4-7. All these Ln-MOFs were extensively characterized by various spectroscopic techniques (UV-vis and FTIR), elemental analyses, thermogravimetric analysis and powder X-ray diffractometry. All but La complexes show very intense characteristic luminescence features that confirm the antenna effect of the ligand on the metal centre. Complexes 2, 4, 8 and 9 display selective sensing of trinitrophenol (TNP) in water with the best detection limit of 1 ppm for 4.
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