In this study, removal of zinc (Zn^{2+}) and cadmium (Cd^{2+}) from aqueous solutions is investigated using bentonite/polypyrrole (B-Ppy) composite. The effect of pH, initial ion concentration and time were determined using batch adsorption technique. Maximum adsorption was recorded at a pH of 5 and equilibrium sorption was achieved within 60 minutes of the process. Equilibrium isotherm models applied showed the Langmuir and Freundlich isotherms model with the best regression coefficient R^2 The Langmuir isotherm constant (b) and the Freundlich constant (n) indicated a high affinity of B-Ppy composite for zinc (II) and cadmium (II) ions. The surface morphology, the thermal and optical properties of the composite were studied with scanning electron microscopy (SEM), differential scanning calorimetry (DSC) and UV-vis spectroscopy, respectively. The results show that the addition of the bentonite improves the thermal stability of polypyrrole (Ppy) which is due to the interfacial interaction between the Ppy and the bentonite. The experimental results indicated the potential of B-Ppy composite as a low-cost adsorbent for zinc and cadmium removal from aqueous solutions