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Ammonium metal phosphates: Emerging materials for energy storage

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Abstract

The search for new materials that can hold the heteroatoms viz., nitrogen, oxygen and phosphorus becomes crucial for robust energy storage and conversion devices. Recently, ammonium metal phosphates (NH_4MPO_4 , $\text{M} = \text{Mn}^{2+}$, Ni^{2+} , Co^{2+} , Fe^{2+} , etc.) and their hydrates have emerged as promising materials because of their attractive virtues; rapid electron transport because of the existence of more electroactive sites; and highly redox-active centres and rapid ion transport because of the intercalated water interactions. The synthesis of different dimensionalities (0D–3D) of these materials is facile and robust that boosts the electrochemical performances to some extent. This review emphasises the recent state-of-the-art work published on the ammonium metal phosphates for energy storage and a brief discussion on key challenges and future directions.