

New isopolyoxomolybdates derived from heptamolybdate
with UO_2^{2+} and Th^{4+} ions

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Abstract. Uranyl (UO_2^{2+}) and thorium (Th^{4+}) polyoxomolybdates, containing strictly $[\text{Mo}_7\text{O}_{24}]^{6-}$ entity, have been synthesized by self-assembly from raw materials as $\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$, uranyl acetate and thorium nitrate in acidic media under controlled conditions of temperature and pH. Although some polyoxometalates derived from heptamolybdate ($[\text{Mo}_7\text{O}_{24}]^{6-}$) presently are known, the novelty of this work derives from the fact that for the newly synthesized units accomplishments for their chemical characterization was foreseen through the data obtained by the mean of state of art technique as Fourier Transformed Infrared Spectroscopy (FTIR), UV-vis spectrophotometry, scanning electronic microscopy (SEM) with electron diffraction X-ray (EDX) detection, and thermogravimetric analysis. Our work reveals that all the polyoxomolybdates containing the $[\text{Mo}_7\text{O}_{24}]^{6-}$ unit might have reduced retaining properties when compared with the polyoxomolybdate including in its structure the $[\text{Mo}_4\text{O}_{13}]^{2-}$ unit. The polyoxomolybdate containing the $[\text{Mo}_7\text{O}_{24}]^{6-}$ entity can be used in the synthesis process of raw materials with direct application in the concentration/preconcentration of radioactive cations including UO_2^{2+} and Th^{4+} from aqueous solution.

Keywords: isopolyoxomolybdates uranyl, thorium, synthesis, characterization.