The nitrate anion, NO$_3^-$, is known to be widely used in different stages of the PUREX (Plutonium and Uranium Recovery by Extraction) process [1]. By changing nitrate concentration of the initial solution, one may control separation of actinides by various procedures. Three major coordination environments by ligands are observed for linear (UO$_2^+$) uranyl (Ur) ion in oxocompounds. It is typically coordinated by four, five or six ligands, arranged at the equatorial vertices of UrO$_4$ (square), UrO$_5$ (pentagonal bipyramid) or UrO$_6$ (hexagonal bipyramid), respectively. Nitrate groups in inorganic uranium compounds may either directly coordinate uranyl ion thus forming [(UO$_2$)(NO$_3$)$_n$X$_m$] or being bonded to interstitial cations only with formation of [(UO$_2$)X$_m$](NO$_3$)$_n$ complexes, where X = O, Cl, Br. Four new uranyl-nitrate compounds were obtained from aqueous solutions: (CH$_3$)$_2$(NH$_2$)$_2$[(UO$_2$)$_2$(NO$_3$)$_2$(CrO$_4$)$_2$(H$_2$O)]H$_2$O (1), (15-crown-5)$_2$[(UO$_2$)$_2$(H$_2$O)$_4$(O$_2$)(NO$_3$)$_2$](H$_2$O)$_3.5$ (2), Cs$_2$[(UO)$_2$(NO$_3$)$_4$(OH)$_2$] (3) and Rb$_3$[(UO$_2$)Cl$_3$(NO$_3$)](NO$_3$) (4). The structure of 1 is the first observation of one-dimensional unit (chain) with nitrate groups coordinating UrO$_6$ hexagonal pyramids and formation of [(UO$_2$)$_2$(NO$_3$)$_2$(CrO$_4$)$_2$(H$_2$O)]$. Compound 2 is a rare example of organically templated uranyl compound containing peroxide component with neutral organic and inorganic constituents. Neutral 15-crown-5 and H$_2$O molecules are packed around [(UO$_2$)$_2$(H$_2$O)$_4$(O$_2$)(NO$_3$)$_2$] units providing structural stability exclusively via hydrogen and Van-der-Waals bonding. [(UO)$_2$(NO$_3$)$_4$(OH)$_2$] clusters in the structure of 3 were not previously observed in inorganic compounds without organic molecules. And the structure of 4 contains both, NO$_3^-$ directly coordinating uranyl and nitrate bonded to Rb atoms only. The latter is reflected in the structural formula of 4.

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