Synthetic tinsleyite $K[Al_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$ has been obtained by the reaction of gibbsite with a potassium-phosphate solution of $pH = 7$ at $423 \, K$ within five days. A single crystal X-ray structure analysis has shown that synthetic tinsleyite is isotypic with the mineral leucophosphite $K[Fe_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$. Crystal data: monoclinic space group $P2_1/n$, $a = 949.9(2) \, \text{pm}$, $b = 950.3(2) \, \text{pm}$, $c = 953.5(2) \, \text{pm}$, $\beta = 103.26(3)^\circ$, $Z = 4$. The structure of tinsleyite consists of tetranuclear $Al_4O_2$ units formed by a central pair of edge sharing $AlO_6$ octahedra, to which two additional $AlO_6$ octahedra are attached sharing corners. These units are crosslinked by phosphate ions to a three dimensional framework structure with tunnels along [010], occupied by potassium cations. While one type of water molecules is attached to $Al$, a second type is fixed in the structure by hydrogen bonds only. As a consequence two steps for thermal loss of water at $341 \, K$ and $471 \, K$ are observed.