The Gold Sulfates MAu(SO$_4$)$_2$ (M = Na, K, Rb)

Mathias S. Wickleder and Oliver Büchner

Institut für Anorganische Chemie, Universität zu Köln, Greinstrasse 6, D-50939 Köln, Germany

Reprint requests to PD Dr. Mathias S. Wickleder. Fax: +49 (0)221 470 5083.
E-mail: m.wickleder@uni-koeln.de

Z. Naturforsch. 56 b, 1340–1343 (2001); received September 10, 2001

Gold, Sulfate, Alkali Metals

The evaporation of a solution of Au(OH)$_3$ and Na$_2$SO$_4$ in conc. sulfuric acid led to yellow single crystals of NaAu(SO$_4$)$_2$ (monoclinic, $P2_1/n$, $Z = 2$, $a = 469.1$, $b = 845.9$, $c = 831.2$ pm, $\beta = 95.7^\circ$). Analogous procedures with K$_2$SO$_4$ or Rb$_2$SO$_4$ instead of Na$_2$SO$_4$ yielded single crystals of KAu(SO$_4$)$_2$ (monoclinic, $C2/c$, $Z = 4$, $a = 1109.8$, $b = 724.2$, $c = 941.1$ pm, $\beta = 118.4^\circ$) and RbAu(SO$_4$)$_2$, respectively, (triclinic, $P\bar{1}$, $Z = 1$, $a = 423.6$, $b = 497.5$, $c = 889.0$ pm, $\alpha = 76.4^\circ$, $\beta = 88.4^\circ$, $\gamma = 73.5^\circ$). Although the crystal structures of the three sulfates are not isotypic they show similar structural features: The gold atoms are coordinated by four oxygen atoms in a square planar manner. These oxygen atoms belong to four SO$_4^{2-}$ ions which link the [AuO$_4$] units to infinite chains according to $\frac{1}{\sqrt{2}}$[Au(SO$_4$)$_4$]$^2-$. These chains are connected via the monovalent cations which show coordination numbers of 6 (Na$^+$), 10 (K$^+$) and 12 (Rb$^+$), respectively.