

## **Core level electron binding energies of realgar (As<sub>4</sub>S<sub>4</sub>)**

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### **ABSTRACT**

XPS broad scans and high-resolution narrow-region spectra were collected from fresh realgar (As<sub>4</sub>S<sub>4</sub>) surfaces to measure core level S and As binding energies. Reasonably accurate As and S concentrations were determined from XPS broad scans using peak areas and manufacturer supplied sensitivity factors. High resolution S(2p) and As(3d) narrow region spectra were comprised of photoelectron emissions indicative of As and S in intermediate oxidation states akin to binding energies of As and S polymeric species. S(2p) spectra were interpreted using only S contributions expected from the bulk mineral matrix and showed that S was not greatly affected by surface state phenomena. This was attributed to breakage of intermolecular van der Waals bonds rather than covalent interatomic bonds. As(3d) spectra were found to contain two contributions one from As atoms in As<sub>4</sub>S<sub>4</sub> molecules in the bulk mineral matrix and another possibly from As atoms in molecules situated at the surface.