

Gold extraction at the molecular level using $\hat{1}\pm$ - and $\hat{1}^2$ -cyclodextrins

Description

Cyclodextrins (CDs) are known for their ability to form supramolecular interactions with a wide range of guest molecules. In this review, the focus is given on the inclusion of complex aurate ions such as tetrabromoaurate, dicyanoaurate, and a few other tetrahaloaurates. The review describes the properties of self-assembly of cyclodextrins with these ions, with a highlight to $\hat{1}\pm$ -CD and, more recently, $\hat{1}^2$ -CD, requiring the use of a co-former/precipitating agent. Practical applications of this ability include the selective isolation of gold from a variety of sources, ranging from gold-rich mining ores and tailings/mining wastes to gold-bearing metal scraps obtained from discarded electronic devices. Moreover, it describes the development of a method based on the spontaneous complex formation between $\hat{1}\pm$ -CD and tetrabromoaurate, as well as its current status of use in a few mining sites in the United States.

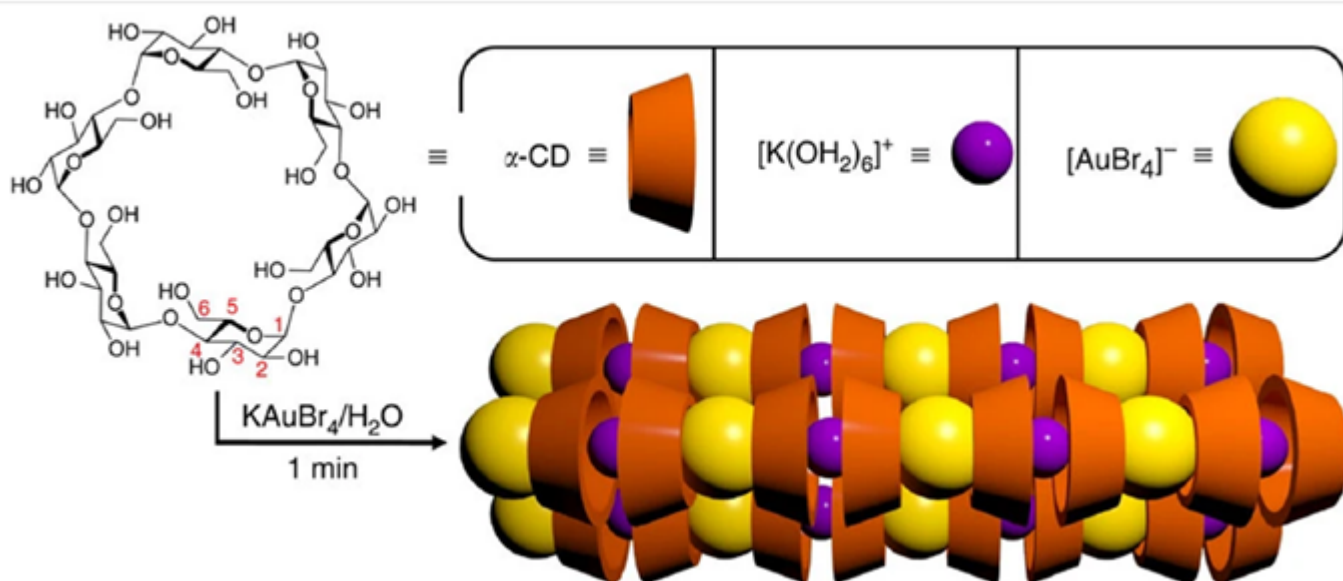


Figure: Schematic depiction of the $\hat{1}\pm$ -CD channels containing the polyionic $\{[K(OH_2)_6]^+[AuBr_4]^- \}_n$ chain inside. Reproduced from $\hat{1}\pm$ -Selective isolation of gold facilitated by second-sphere coordination with $\hat{1}\pm$ -cyclodextrin © 2013 Z. Liu et al.,

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1. News