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The formation of Mo-polyoxometalates during large-scale molybdenum target recycling.

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ABSTRACT

Prior to the solvent extraction processes to recover enriched Mo-disc material, solutions of Mo in alkali are acidified with HCl to a final [H^+] of approximately 5M. During this acidification step relatively large amounts of insoluble KCl are formed as well as a bright yellow precipitate that was later discovered to contain Mo. Powder x-ray diffraction revealed that the yellow solid is $K_3PO_4(MoO_3)_{12}\bullet 4H_2O$. The source of phosphate is most likely the phosphate-stabilized 50% H_2O_2. This yellow precipitate exhibits a wide range of solubility in alkali, water, and strong acids. Furthermore, we found that the precipitate could be generally avoided by adding Mo/KOH to a solution of HCl rather than acidifying a Mo/KOH solution. Qualitative and quantitate analysis of the precipitate are described.