Towards pure phase of the quaternary metal oxide $CuBiW_2O_8$

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Copper Bismuth Tungstate ($CuBiW_2O_8$) is a semiconductor metal oxide with very scarce literature available [1]. This material has been recently forecast by *Sarker* and coworker as a suitable candidate for energy conversion via photoelectrochemical approach [2]. Our goal is to find an easy viable route to obtain pure $CuBiW_2O_8$ to than perform on it fine structural, electrical and optical characterizations. We are currently working on solid-state reactions from the stoichiometric mixture of $CuBiW_2O_8$ precursors, such as Cu_2O, Bi_2O_3 and WO_3, to obtain its pure phase. Different combinations of reaction time and temperatures have been tested, respectively from 1h up to 30h and from 600°C up to 750°C. Using x-ray powder diffraction (XRD) as a guide, in our best result so far, we could confirm the formation of the desired phase, but with other phases appearing within the diffractogram, which match with Bi_2WO_6 (Russelite), $CuWO_4$ and also an yet not matched peak around 25º (two theta). Simultaneous thermal analysis (TGA/DSC) was also performed on trying to better understand the reaction and to find aim temperatures for the solid-state reactions. Unfortunately, the TGA/DSC results did show any important heat flow or mass change along the analysis, just a slight heat loss around 660°C.

[1] T. F. Krüger and H. Müller-Buschbaum, "Ein mit β-$CuNdW_2O_8$ und β-$LiYbW_2O_8$ verwandtes Kupfer-Wismut-Oxowol-framats: $CuBiW_2O_8$," *Journal of Alloys and Compounds,* vol. 190, pp. L1-L3, 1992.

[2] P. Sarker, D. Prasher, N. Gaillard, and M. N. Huda, "Predicting a new photocatalyst and its electronic properties by density functional theory," *Journal of Applied Physics,* vol. 114, 2013.