Electronic Supplementary Material (ESI) for Chemical Communications

Supporting Information

Sonochemical Synthesis of Copper Hydride (CuH)

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Determining the impurity phase in the CuH product

Fig. S-1 below shows the X-ray diffraction (XRD) pattern of the sonochemistry product, as well as the JCPDS files of CuO, Cu_2O, and Cu. The impurity shoulder peak at 40 degree cannot be assigned to any of these copper substances.

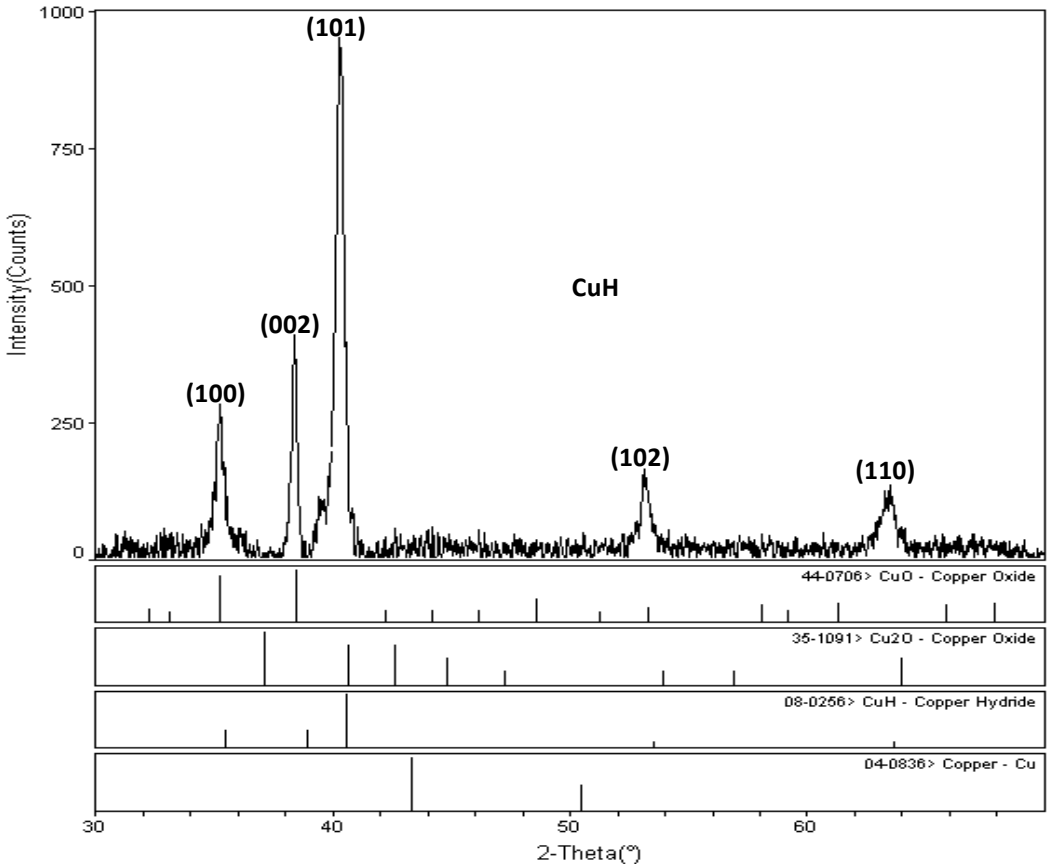

Fig. S-1. XRD pattern of the sonochemistry product.

X-ray photoelectron spectroscopy (XPS) was also performed in order to determine the impurity in the sample. The survey spectrum only shows four elements:

Cu, Ti, O and C. Fig. S-2 shows the Ti 2p XPS pattern of the CuH product. The Ti $2p_{3/2}$ and Ti $2p_{1/2}$ peaks at 457 and 463 eV, respectively are attributed to Ti^{4+}. Combining the XRD and XPS results, we think the impurity in the CuH product should be TiO_2.

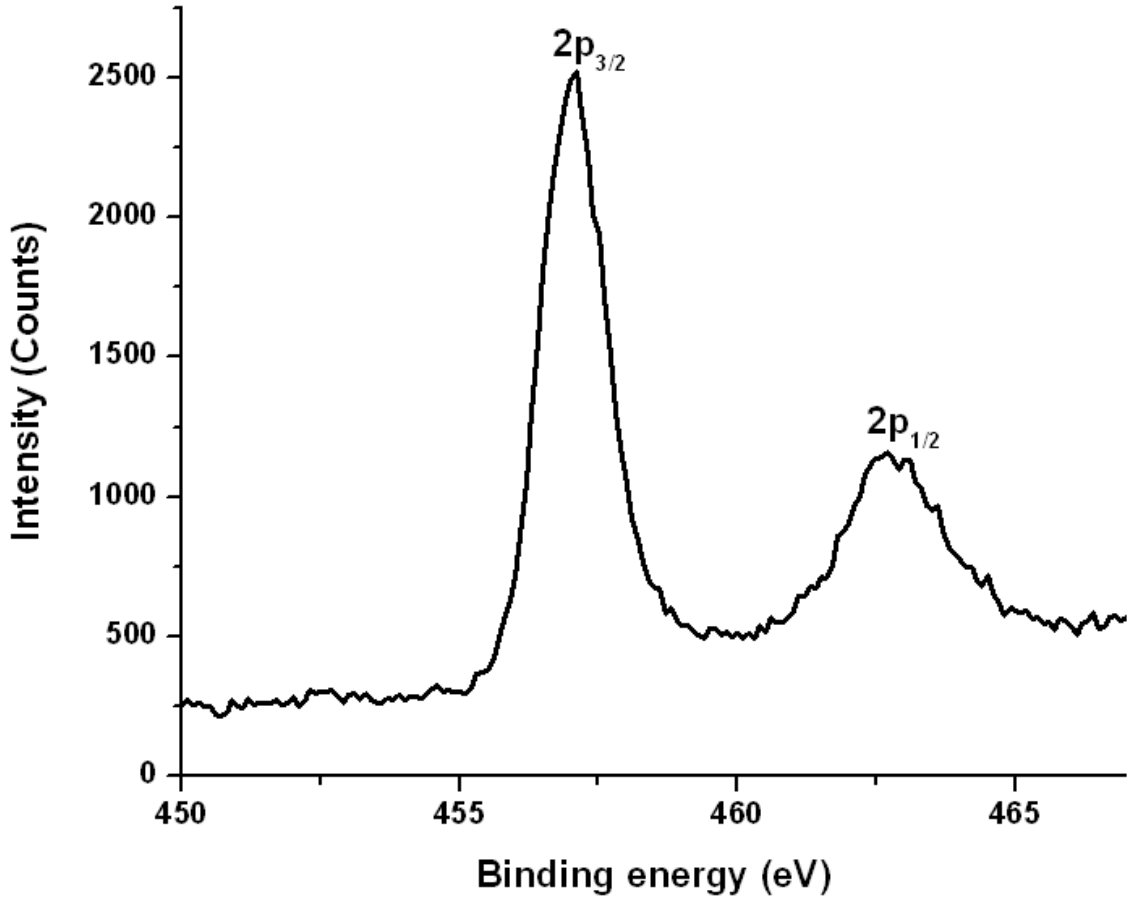

Fig. S-2. Ti 2p XPS spectrum of CuH.

In order to check if TiO_2 is a normal contamination in the sonochemical syntheses, we carried out the synthesis of gold nanoparticles by sonochemistry. As can be seen from Fig. S-3, the impurity peak at around 40 degree also appears in the XRD spectrum in addition to the Au peaks. We have also used a horn sonicator in another lab and obtained the same results. These experiments show that TiO_2 is a normal contamination in our sonochemical syntheses.

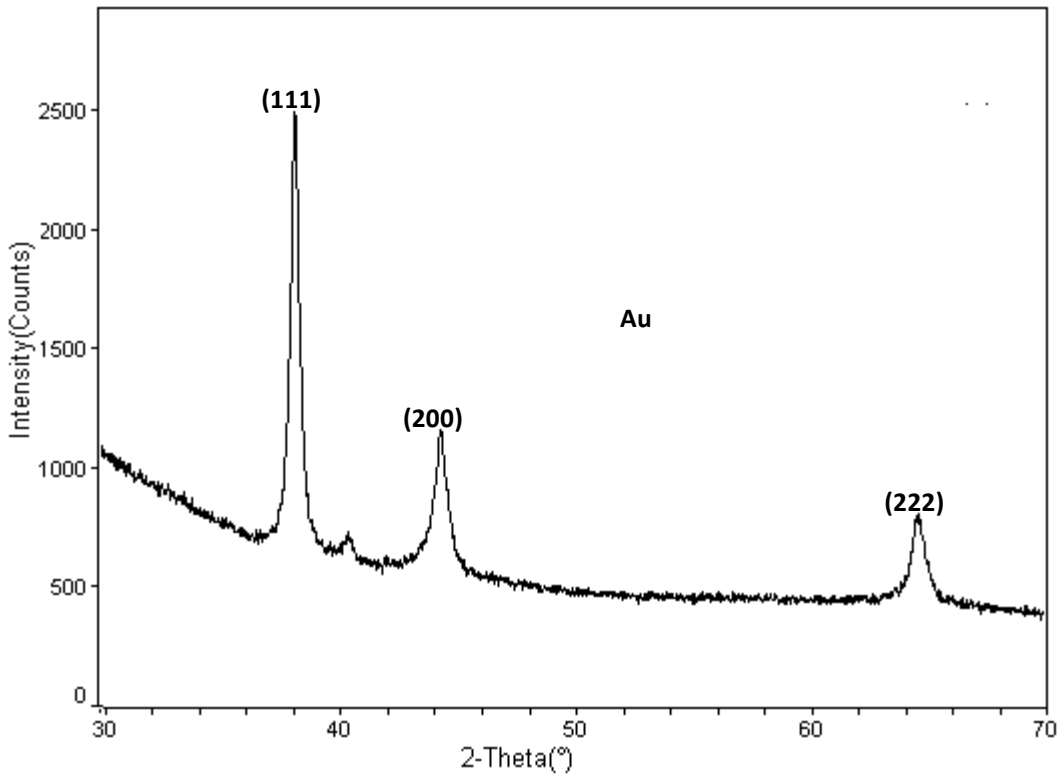

Fig. S-3. XRD pattern of Au prepared by sonochemistry.