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【516】 Cu₂O: Electron Dynamics and Defect Trapping in a Potential Photocathode Material

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Electrodes for photocatalytic water splitting have to fulfill several requirements like high light absorption and efficient carrier transport to the surface without energy loss. Cuprous oxide is a prime candidate due to the small, direct bandgap and to abundant and cheap constituents, but the photochemical conversion efficiencies found so far are well below the theoretically possible figures. Using time-resolved ARPES, we studied the (111)-surface of Cu₂O and investigated the effects of defects present in the surface. Supported by DFT calculations we could identify oxygen vacancy states to be responsible for carrier trapping and, thereby the low performance of this material.

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