

## Photocatalytic Activity of Bulk TiO<sub>2</sub> Anatase and Rutile Single Crystals Using Infrared Absorption Spectroscopy

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A systematic study on the photocatalytic activity of well-defined, macroscopic bulk single-crystal TiO<sub>2</sub> anatase and rutile samples has been carried out, which allows us to link photoreactions at surfaces of well-defined oxide semiconductors to an important bulk property with regard to photochemistry, the life time of  $e-h$  pairs generated in the bulk of the oxides by photon absorption. The anatase (101) surface shows a substantially higher activity, by an order of magnitude, for CO photo-oxidation to CO<sub>2</sub> than the rutile (110) surface. This surprisingly large difference in activity tracks the bulk  $e-h$  pair lifetime difference for the two TiO<sub>2</sub> modifications as determined by contactless transient photoconductance measurements on the corresponding bulk materials.