

# Photocatalytic Water Splitting with the Cr-doped $\text{Ba}_2\text{In}_2\text{O}_5/\text{In}_2\text{O}_3$ Composite Oxide Semiconductors

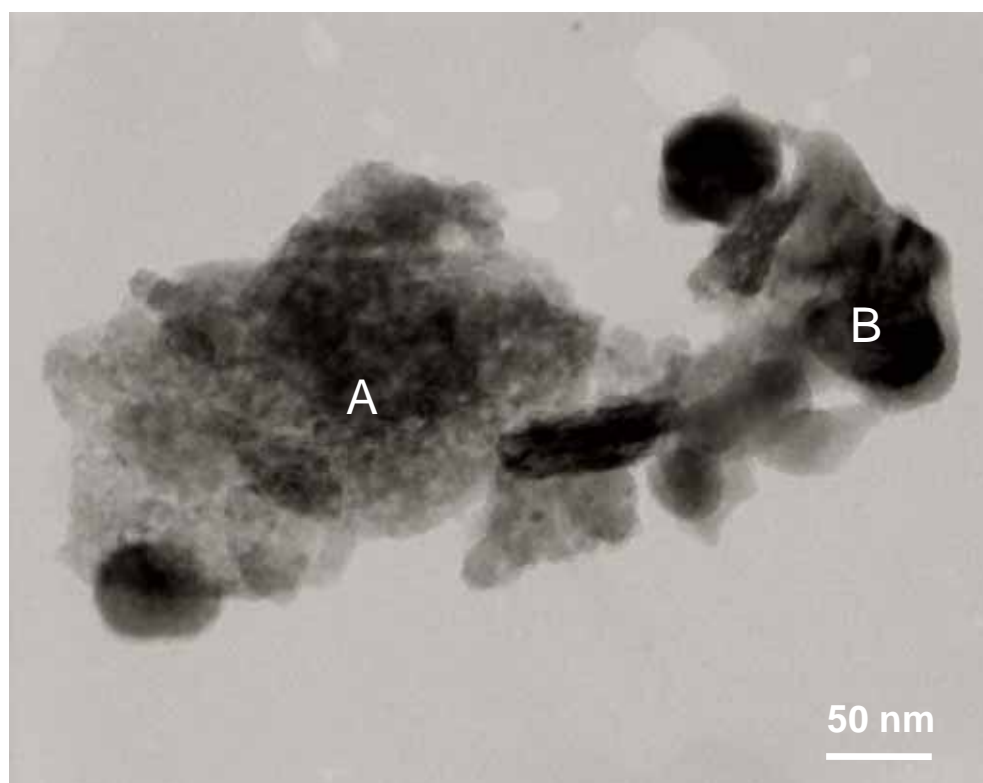
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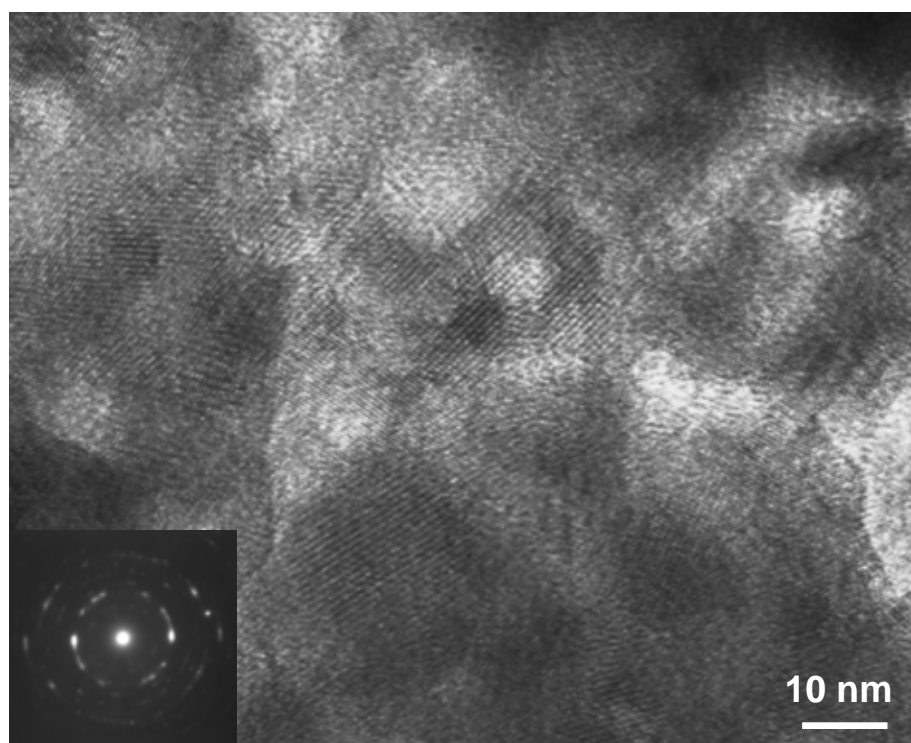
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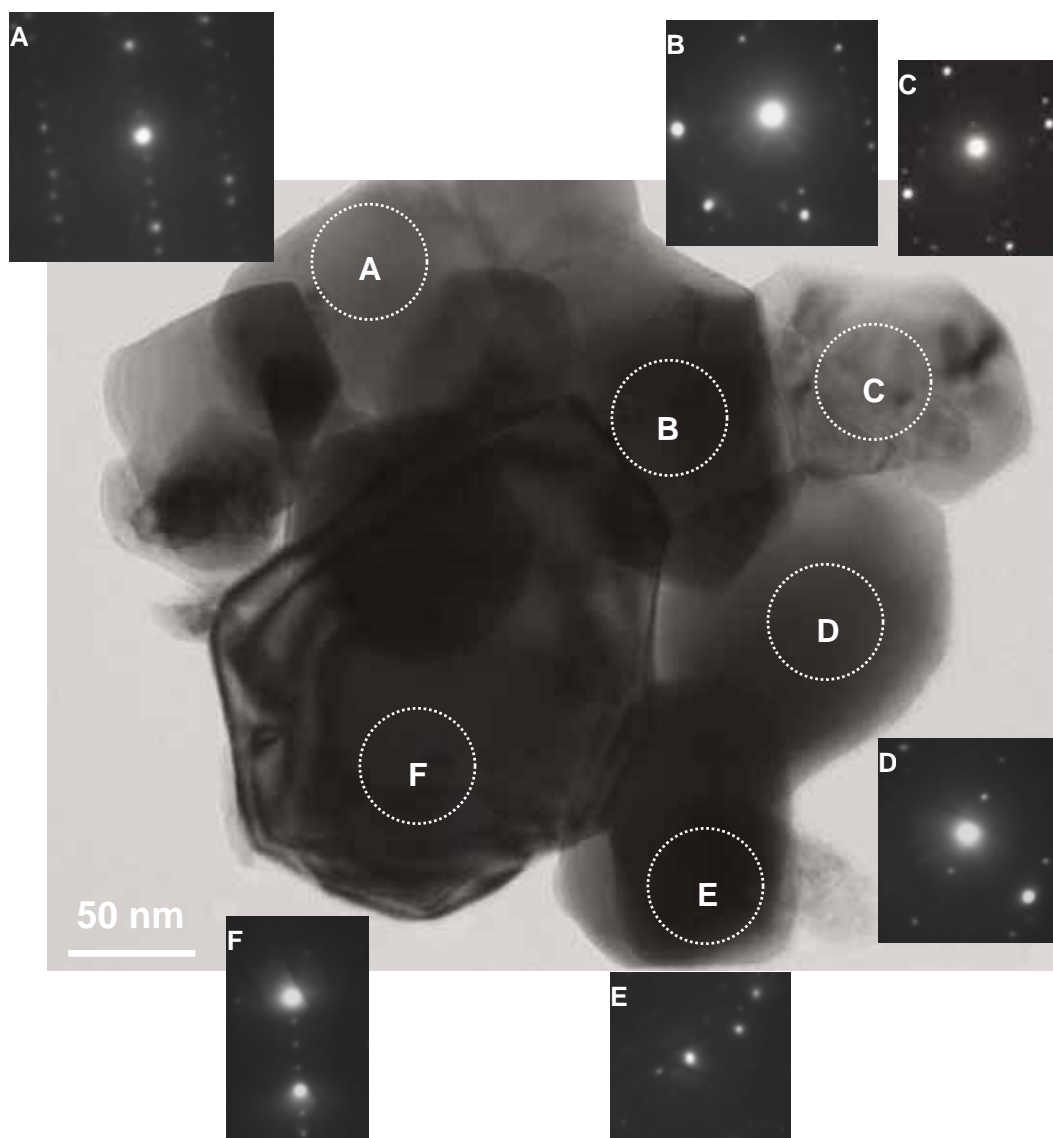
(1) HRTEM micrographs of the composite C-BIO ( $\text{Cr-Ba}_2\text{In}_2\text{O}_5/\text{Cr-In}_2\text{O}_3$ ) powder samples



**Figure S1.** A typical TEM image of C-BIO powder sample comprised of a nano-scaled area (A) and a micro-scaled area (B), depending on the different sizes of raw materials.

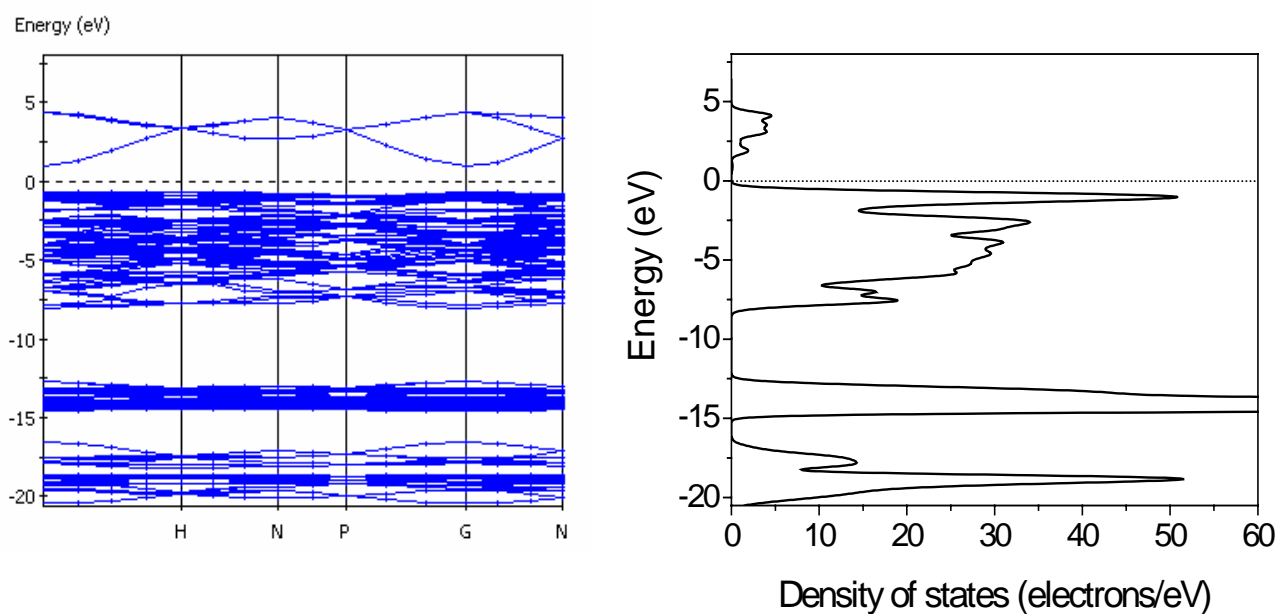


**Figure S2.** HRTEM micrograph and corresponding SAED pattern of the nanocomposite C-BIO in a nano-scaled area. The indexed result indicated that this area of C-BIO is composed of different phases ( $\text{Cr-Ba}_2\text{In}_2\text{O}_5$  and  $\text{Cr-In}_2\text{O}_3$ ) with different crystal orientations, among which an ohmic contact might be formed.

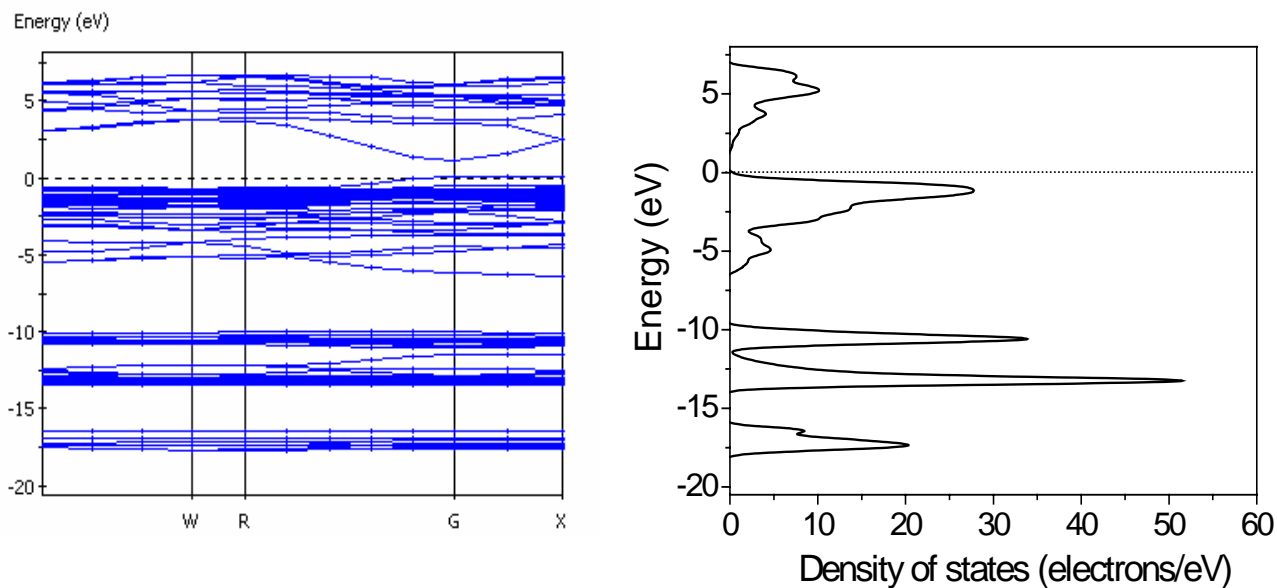


**Figure S3.** TEM micrograph and corresponding SAED patterns in a micro-scaled area of C-BIO, showing different phases and crystal orientations.

(2) Theoretically calculated band structures and total density of states (DOS) of  $\text{In}_2\text{O}_3$  and  $\text{Ba}_2\text{In}_2\text{O}_5$



**Figure S4.** Band structure and total density of states (DOS) of  $\text{In}_2\text{O}_3$



**Figure S5.** Band structure and total density of states (DOS) of  $\text{Ba}_2\text{In}_2\text{O}_5$