CO_2 Electroreduction on Au/TiC: Enhanced Activity Due to Metal–Support Interaction

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CO_2 electroreduction technology is considered an important example of efficient carbon-containing energy sources. Herein, we introduce the metal–support interaction effect with a TiC support for Au/TiC electrocatalysis, which exhibits considerably enhanced activity and selectivity for electroreduction of CO_2 to CO while suppressing H_2 evolution. With this catalyst, an important electronic effect for CO_2 electroreduction was clearly elucidated. Local sp–band charge transfer and d–band shifts play an important role in bonding with both CO and COOH adsorbates. Furthermore, the ideal surface interface between Ti and Au could inevitably maximize the electronic effect, thereby enhancing the catalytic activity of Au/TiC and subsequent CO production.