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Figure S2. The accumulated volume of generated hydrogen vs. reaction time at different initial concentration of AB.



Figure S3. SEM images of  $NiCo_2O_4$  nanoparticles at different magnifications.



Figure S4. The accumulated volume of generated hydrogen vs. reaction time at different cycles

## Peeling test

The pealing test was performed on a WD-D3 Electronic Tensile Testing Machine, which was purchased from Shenzhen Hengzecheng Apparatus Co. Ltd., China. In a typical testing process, the film was fixed on the stainless steel plate, and a scotch tape was bonded with the film. Then, the scotch tape migrates at a rate of 20 mm min<sup>-1</sup> in order to detach the NiCo<sub>2</sub>O<sub>4</sub> layer from Ti substrate. After test, it was found that no NiCo<sub>2</sub>O<sub>4</sub> peel off from the Ti substrate.



