Electronic Supplementary Information (ESI)

Engineering growth of TiO_2 nanofibers on NiO-Ni foam with cleaning and separation function

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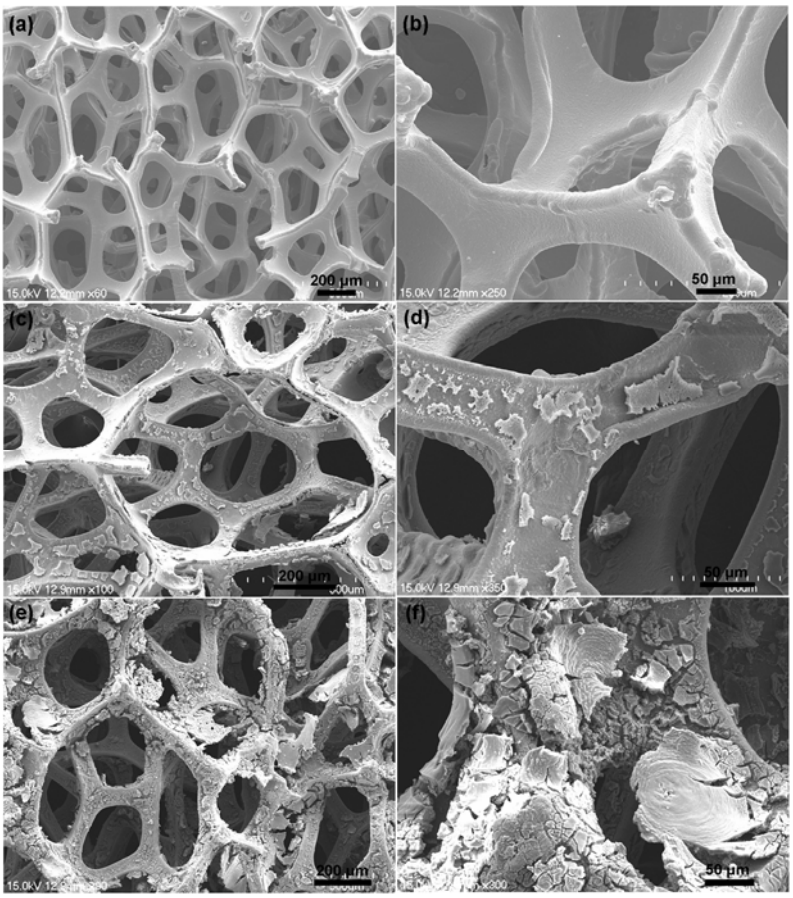

Figure S1. (a, b) SEM image of Ni foam before the coating of TiO_2. The surface of the foam is clean. (c-f) SEM images of Ni foam coated by TiO_2 through the wetting-hydrolysis process. The surfaces of the foam are covered by TiO_2 particles. There are a small amount of TiO_2 particles on the surface of the foam when the wetting-hydrolysis process is not repeated (c and d). A large amount of TiO_2 particles are seen when the wetting-hydrolysis process is repeated three times (e and f).

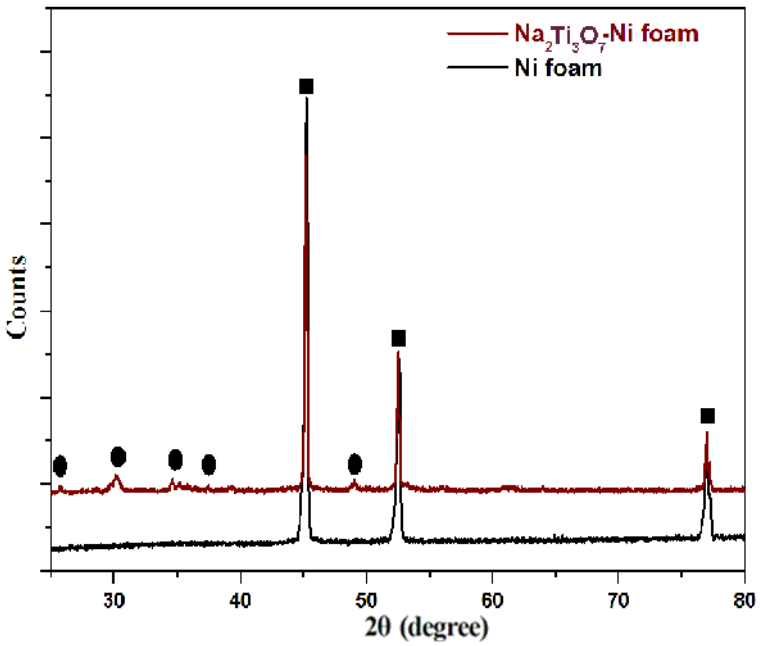

Figure S2. XRD patterns of pure Ni foam and Na_2TiO_3-Ni foam. The peaks marked by box and dot correspond to $Na_2Ti_3O_7$ (JCPDs file, No 31-1329) and Ni (JCPDs file, No 01-1260), respectively. XRD characterization reveals that Na_2TiO_3 has been successfully grown on the foam after hydrothermal reaction.

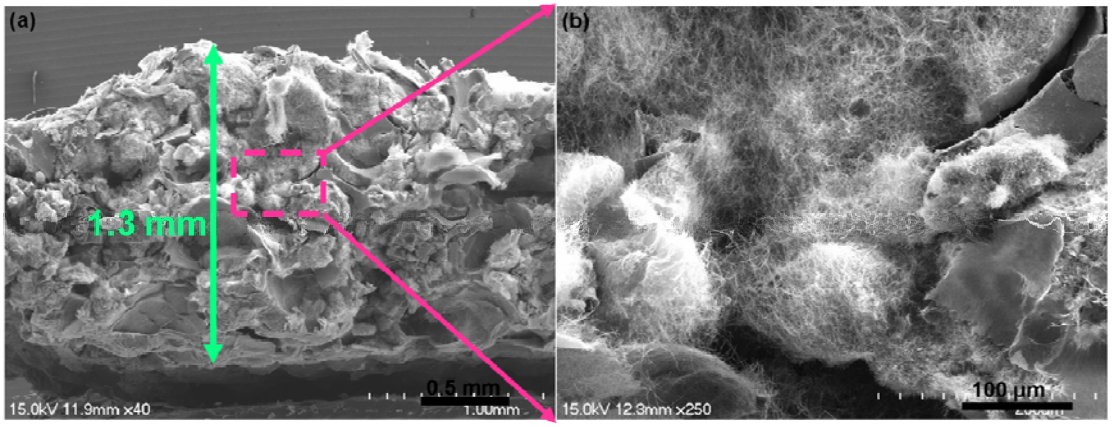

Figure S3. (a) SEM characterization of the cross section of the modified foam, which clarifies that the thickness of the modified foam is about 1.3 mm. (b) SEM image corresponding to the region marked by the square in (a). Nanofibers grew inside the foam and they are firmly anchored with the foam, indicating the TiO_2 modified foam is a class of recoverable and durable photocatalytic material.

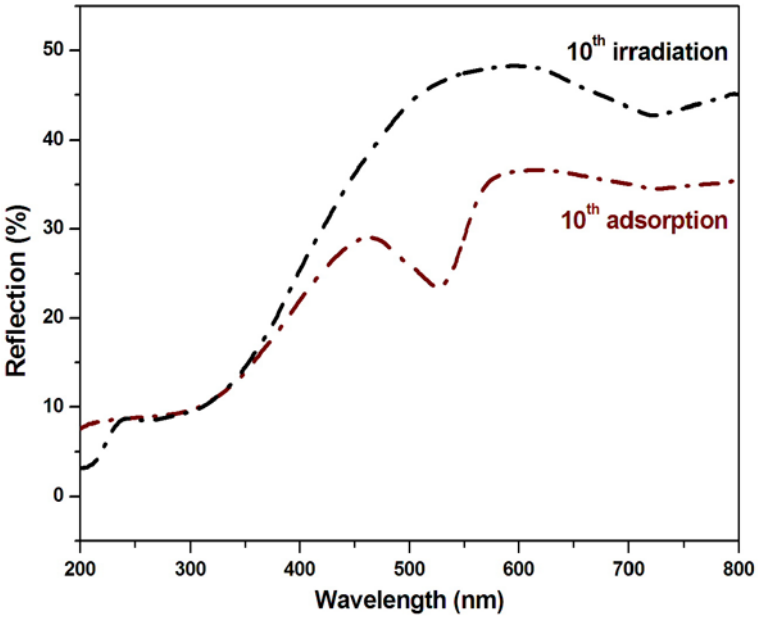

Figure S4. Diffuse reflection spectra of modified foam after ten times of adsorption and irradiation with UV light. It can be seen that the modified foam still has a strong adsorability towards RhB and a high photocatalytic activity.

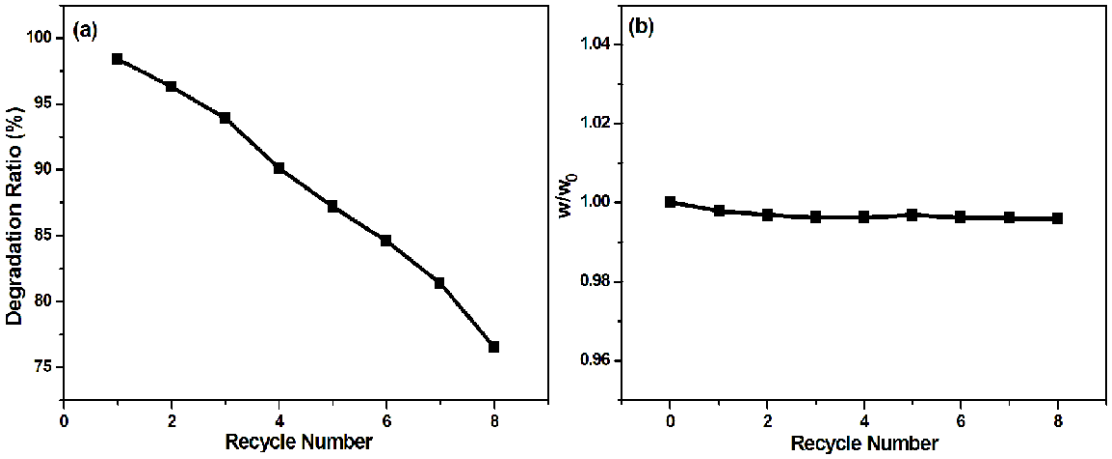

Figure S5. (a) Curve of the degradation ratio of RhB versus reuse times of modified foam under UV light irradiation for 50 min; (b) Relationships of the catalyst weight with reuse times, where w_0 indicates the initial catalyst weight and w indicates the catalyst weight of certain recycle number. No catalyst loss was observed during the repeated photocatalytic test.

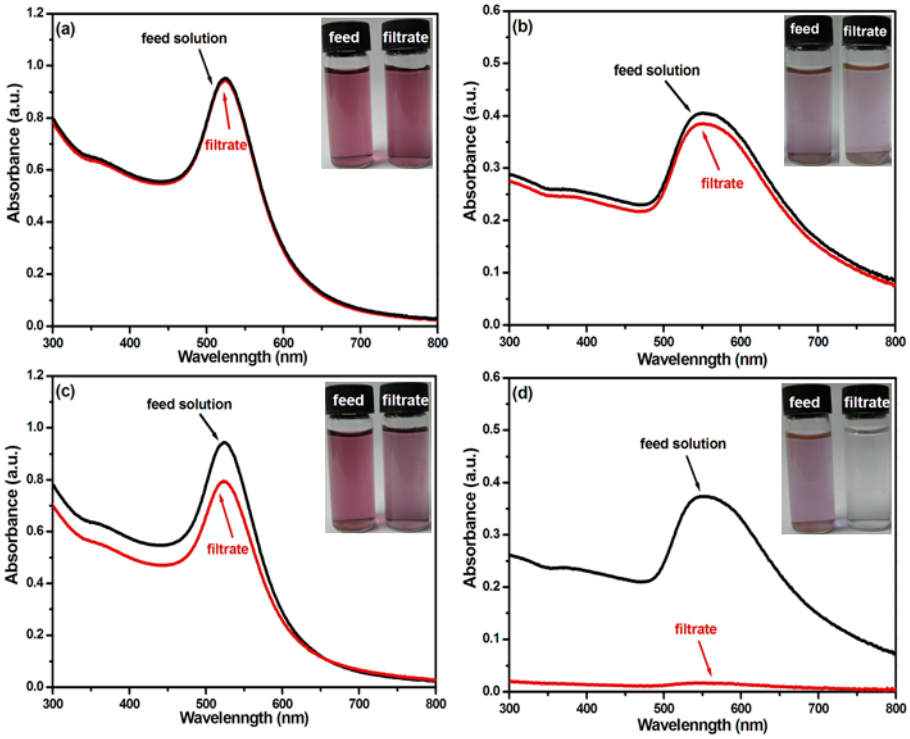

Figure S6. UV-vis spectra of the feed solution and filtrate showing the filtration performance of the pure Ni foam and the modified foam. (a, b) Filtration of 25 nm and 100 nm Au nanoparticles using the pure Ni foam, respectively. (c, d) Filtration of 25 nm and 100 nm Au nanoparticles using TiO_2 nanofiber modified NiO-Ni foam, respectively. The insets in (a–d) show the corresponding photographs of the Au nanoparticle solutions before and after filtration. It can be seen that the TiO_2 nanofiber modified NiO-Ni foam demonstrated better removal rate of Au particles than pure Ni foam.