Electronic supplementary information (ESI):

Nearly monodisperse $Dy_2Sn_2O_7$ nanosphere: Hydrothermal synthesis without template and surfactant and effective sonocatalytic performance

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Characterization:

The phase of the sample is determined by X-ray diffraction (XRD, Bruker, Germany, D8 ADVANCE). Using SEM (Japan, JMS-6610LV) and TEM (USA, FEI Tecnai G20) to study and analyze the morphology of the sample. The surface element composition of the material was measured by XPS, which was carried out on an Escalab 250Xi spectrometer with Al-Kα X-rays as the excitation source. The UV-Vis diffuse reflectance spectra (DRS) of samples were recorded on a Uv-vis spectrophotometer (UV-2550, Shimadzu, Japan) in the 200-800nm wavelength range. The concentration of the dye solution after ultrasonic catalytic degradation was measured in a Uv-vis spectrophotometer (Agilent, Cary 60, USA).

Stability test:

Furthermore, a comparison of PXRD analysis of the fresh and after 4 recycling runs of Dy_2Sn_2O7 was carried out as shown in Fig. S2a. From the XRD spectra, the positions and the intensity of these two samples have no significant changes, indicating that there is no transformation of the crystal structures and the phases of these two samples, indicating that the structure of the $Dy_2Sn_2O_7$ sample was relatively stable. As shown in Fig. S2b, SEM analysis was conducted after 4 cycles. $Dy_2Sn_2O_7$ catalysts showed no significant difference in structure from the fresh catalysts, with microspherical structure, which indicates that the catalyst has ideal physical and chemical stability.

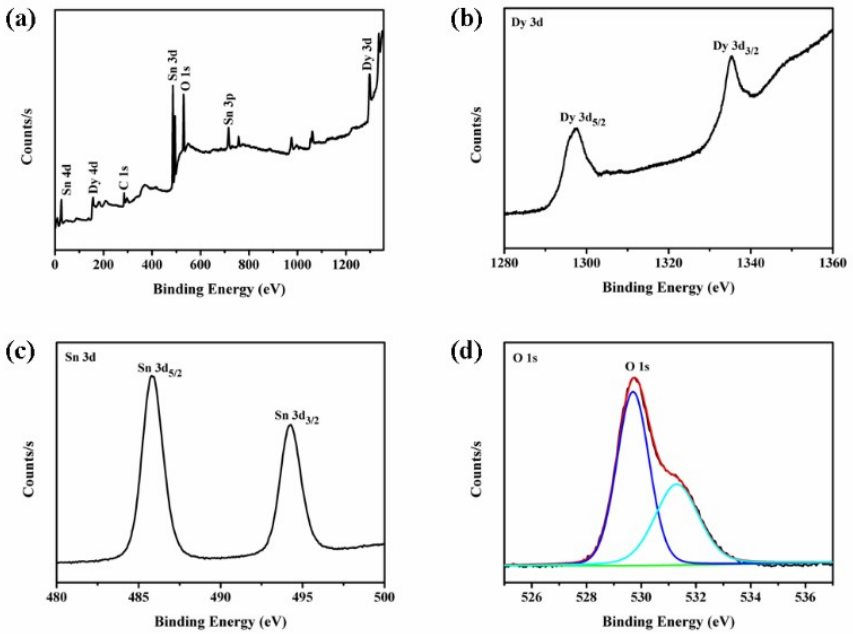

Fig.S1 (a) XPS spectra of $Dy_2Sn_2O_7$ full survey spectrum, (b) Dy 3d, (c) Sn 3d, (d) O 1s

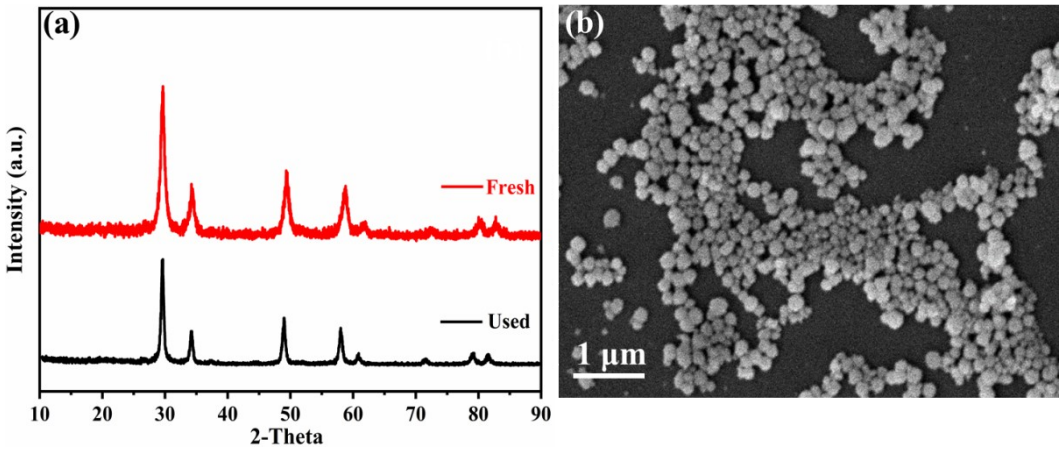

Fig.S2(a)PXRD patterns of the fresh and the used $Dy_2Sn_2O_7$ after 4 recycling run,(b)SEM of the used $Dy_2Sn_2O_7$ after 4 recycling runs.