

Supporting Information (SI)

Design of nanostructured cadmium tantalate and niobate and their photocatalytic properties

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This information contains the following contents:

Figure S1: XRD patterns of precursor of (a) $\text{Cd}_2\text{Ta}_2\text{O}_7$ and (b) $\text{Cd}_2\text{Nb}_2\text{O}_7$ obtained hydrothermally at 180°C for 48h

Figure S2: XRD patterns of cadmium tantalate treated hydrothermally at 180°C for 48h and calcined at 600°C for 8h with different NaOH concentration (a) 0.1M (b) 0.3M and (c) 0.5M

Figure S3: XRD patterns of cadmium niobate treated hydrothermally at 180°C for 48h and calcined at 600°C for 8h with different NaOH concentration (a) 0.1M (b) 0.3M and (c) 0.5M

Figure S4: XRD patterns of cadmium tantalate obtained by hydrothermal method at different temperatures (a) 40°C (b) 80°C (c) 120°C and (d) 180°C for 48h and then calcined at 600°C for 8h (concentration of NaOH, 0.5M)

Figure S5: XRD patterns of cadmium niobate obtained by hydrothermal method at different temperatures (a) 40°C (b) 80°C (c) 120°C and (d) 180°C for 48h and then calcined at 600°C for 8h (concentration of NaOH, 0.5M)

Figure S6: XRD patterns of cadmium tantalate and cadmium niobate synthesized by hydrothermal method at 180°C and calcined at 600°C for 8h at different hydrothermal reaction time (a) 24h and (b) 48h (Concentration of NaOH 0.5M)

Figure S7: XRD patterns of cadmium tantalate treated hydrothermally at 180°C for 48h and calcined at (a) 400°C for 8h (b) 500°C for 8h.

Figure S8: TEM images of (a) cadmium tantalate and (b) cadmium niobate synthesized by hydrothermal method at 180°C for 24h and then calcined at 600°C for 8h.

Figure S9: (a) TEM image of cadmium tantalate after calcining at 800°C (b) TEM image of cadmium niobate after calcining at 800°C (c) TEM-EDX pattern of $\text{Cd}_2\text{Ta}_2\text{O}_7$ nanocubes and (d) TEM-EDX pattern of $\text{Cd}_2\text{Nb}_2\text{O}_7$ nanocubes (e) FESEM-EDX pattern of $\text{Cd}_2\text{Ta}_2\text{O}_7$ nanocubes (f) FESEM-EDX pattern of $\text{Cd}_2\text{Nb}_2\text{O}_7$ nanocubes (inset magnified image).

Figure S10: TEM images of (a) cadmium tantalate and (b) cadmium niobate synthesized by solid state method.

Figure S11: Photocatalytic degradation of Rhodamine B by $\text{Cd}_2\text{Ta}_2\text{O}_7$ and $\text{Cd}_2\text{Nb}_2\text{O}_7$ synthesized by hydrothermal method at 180°C and calcined at 600°C for 8h at (a) pH = 8.5; ($\text{Cd}_2\text{Ta}_2\text{O}_7$) (b) pH = 8.5 ;($\text{Cd}_2\text{Nb}_2\text{O}_7$) (c) pH = 4.5 ($\text{Cd}_2\text{Ta}_2\text{O}_7$) and (d) pH = 4.5 ;($\text{Cd}_2\text{Nb}_2\text{O}_7$) with O_2 purging. [inset: Photocatalytic degradation of Rhodamine B by $\text{Cd}_2\text{Ta}_2\text{O}_7$ and $\text{Cd}_2\text{Nb}_2\text{O}_7$ synthesized by hydrothermal method at 180°C and calcined at 600°C for 8h at different reaction time (i) $\text{Cd}_2\text{Ta}_2\text{O}_7$ (48h), (ii) $\text{Cd}_2\text{Nb}_2\text{O}_7$ (48h), (iii) $\text{Cd}_2\text{Ta}_2\text{O}_7$ (24h) and (iv) $\text{Cd}_2\text{Nb}_2\text{O}_7$ (24h)]

Figure S12: Cycling studies of photodecomposition of (a) $\text{Cd}_2\text{Ta}_2\text{O}_7$ nanocubes (b) $\text{Cd}_2\text{Nb}_2\text{O}_7$ nanocubes and (c) TiO_2 commercial under UV light.

Figure S13: XRD patterns of (a) $\text{Cd}_2\text{Ta}_2\text{O}_7$ nanocubes (b) $\text{Cd}_2\text{Nb}_2\text{O}_7$ nanocubes before and after photocatalytic reaction.

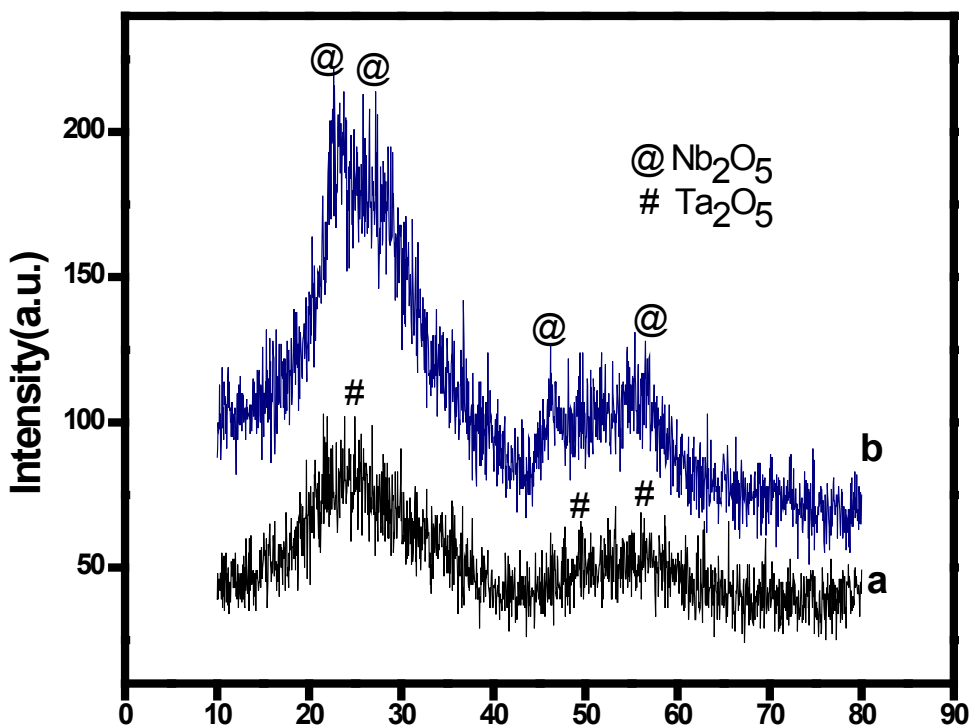


Figure S1

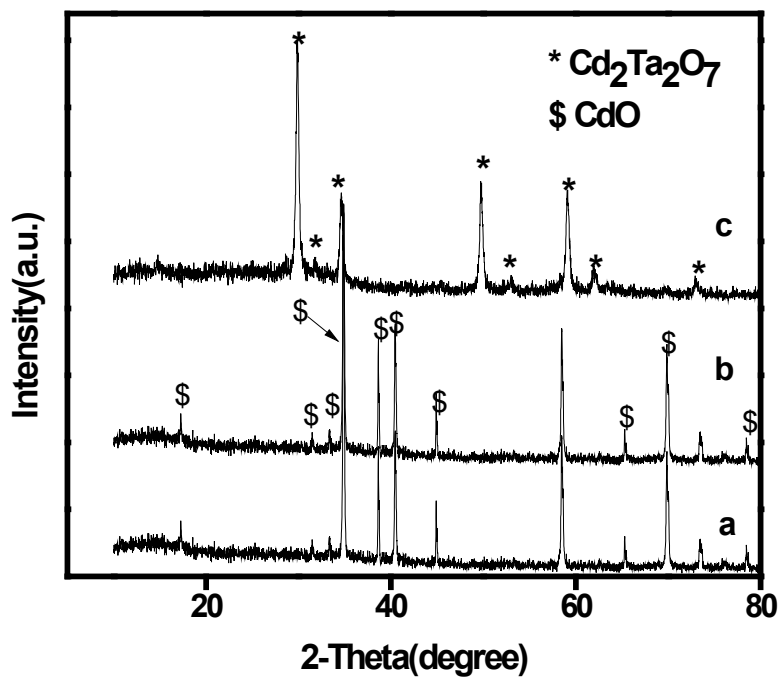


Figure S2

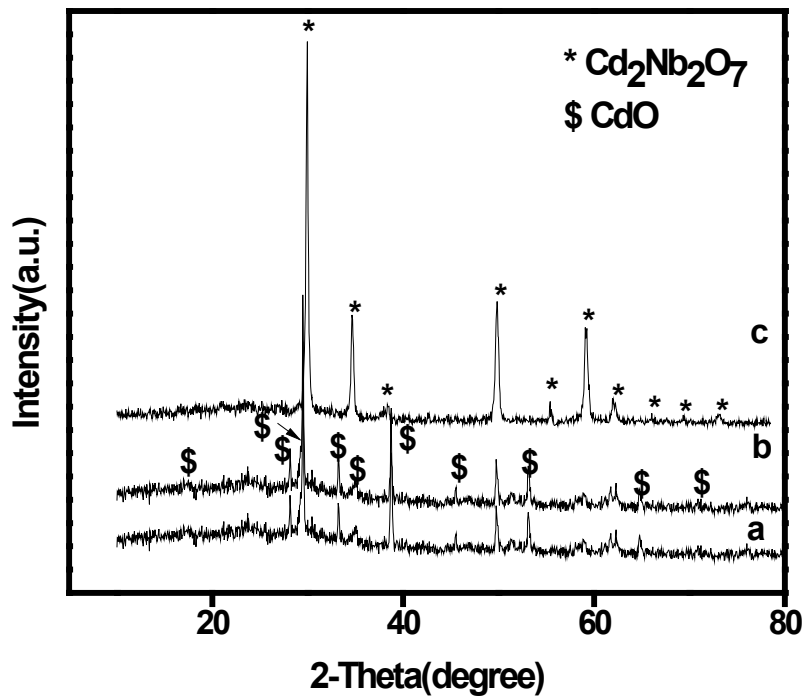


Figure S3

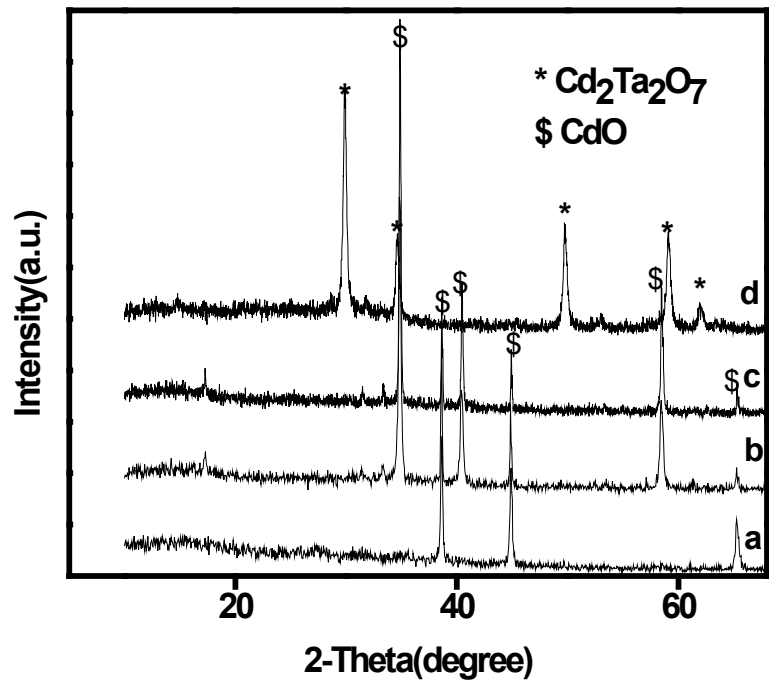


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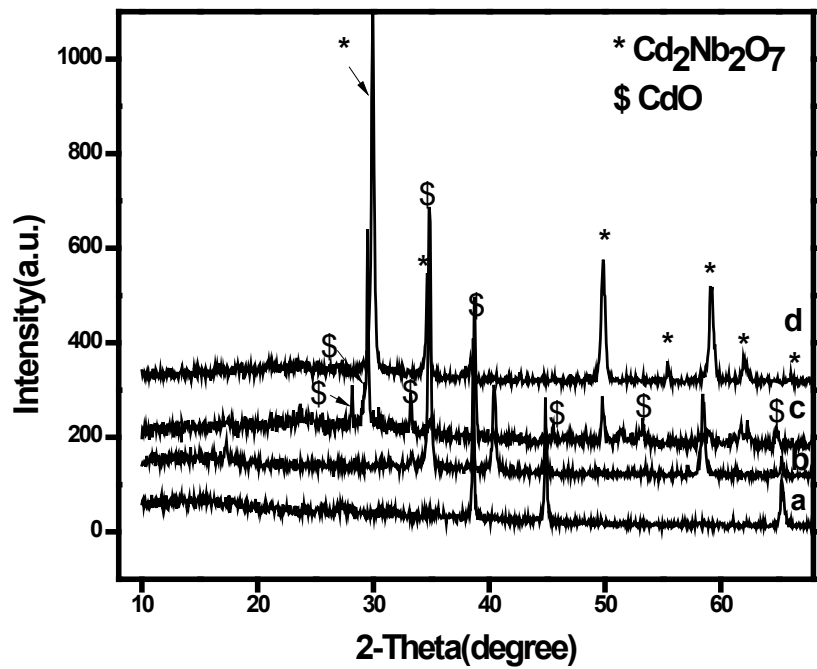


Figure S5

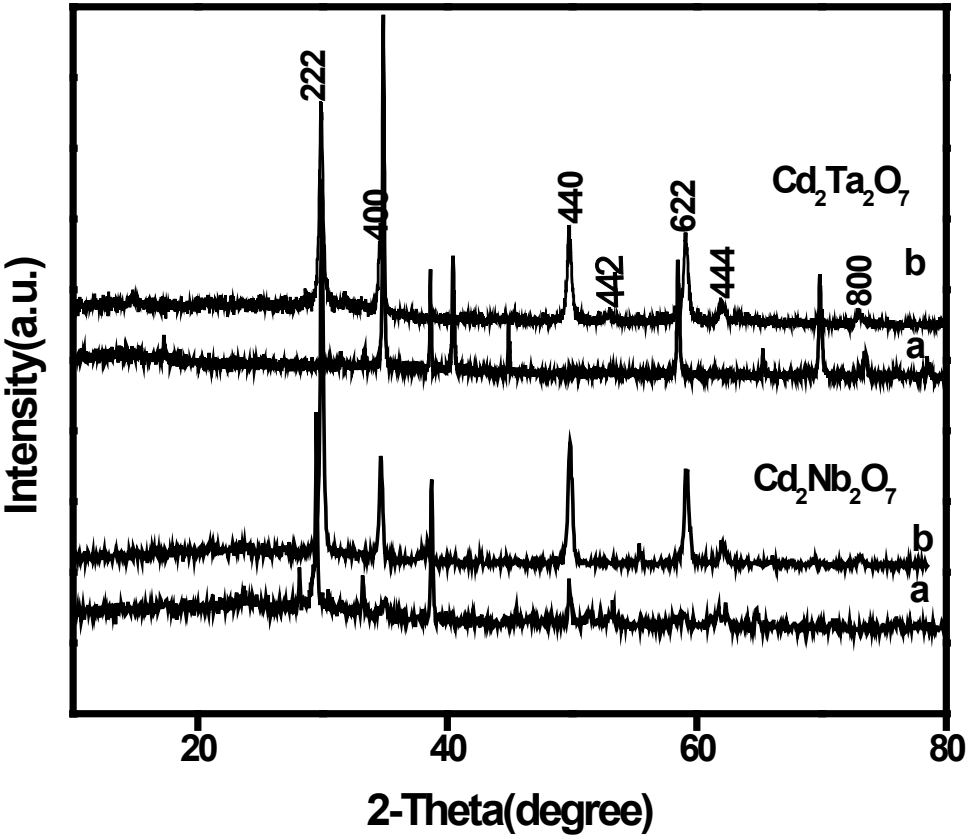


Figure S6

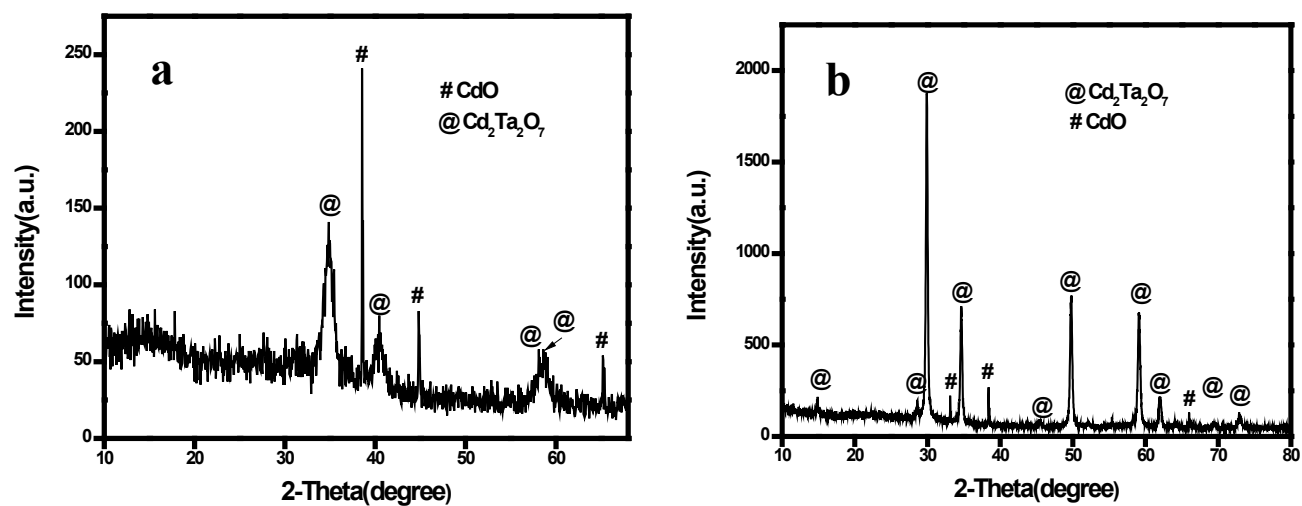


Figure S7

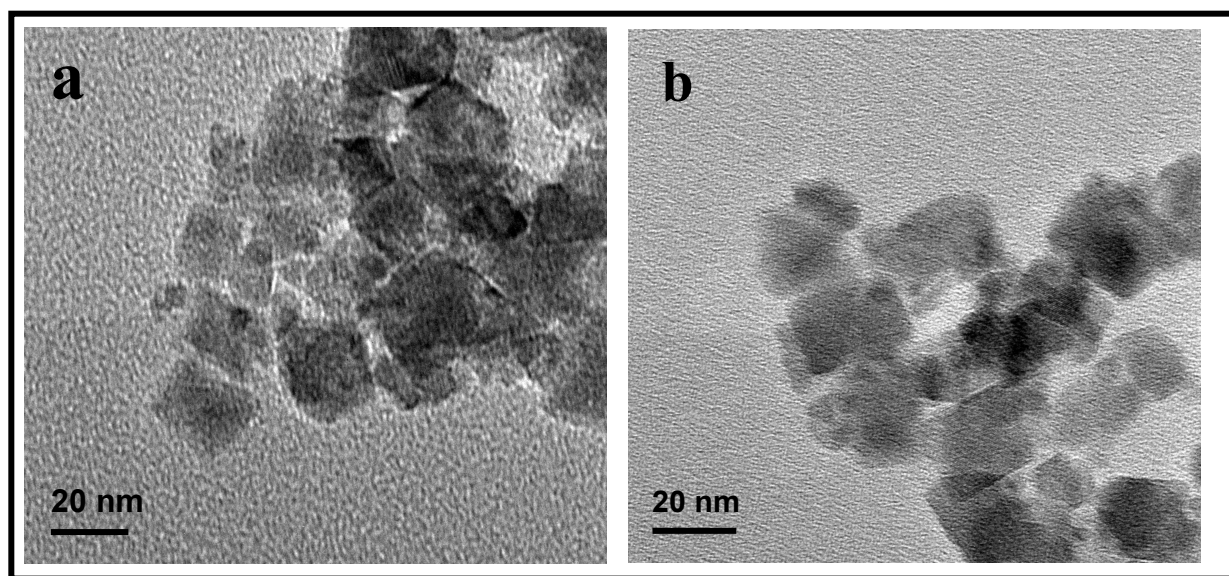


Figure S8

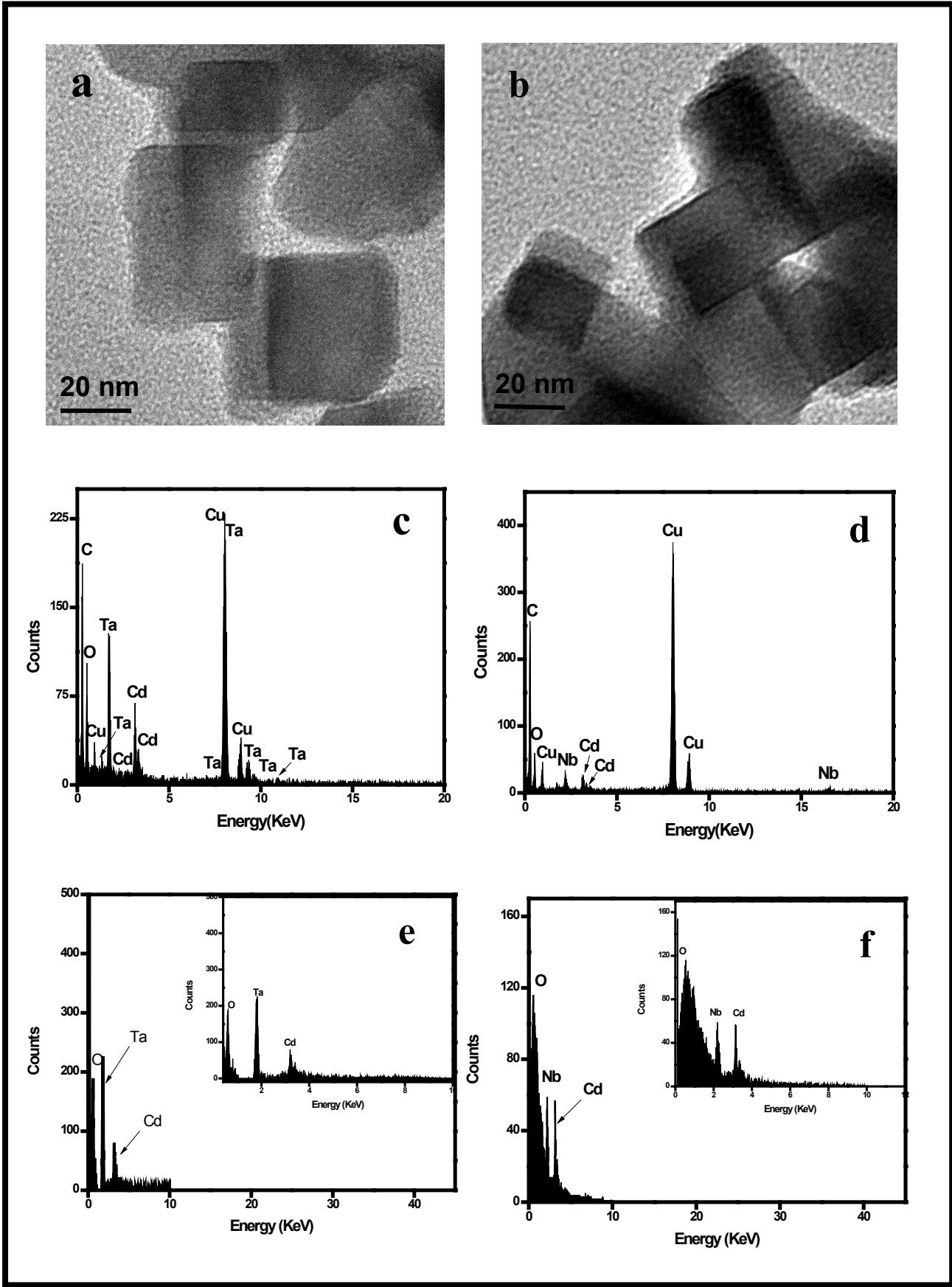


Figure S9

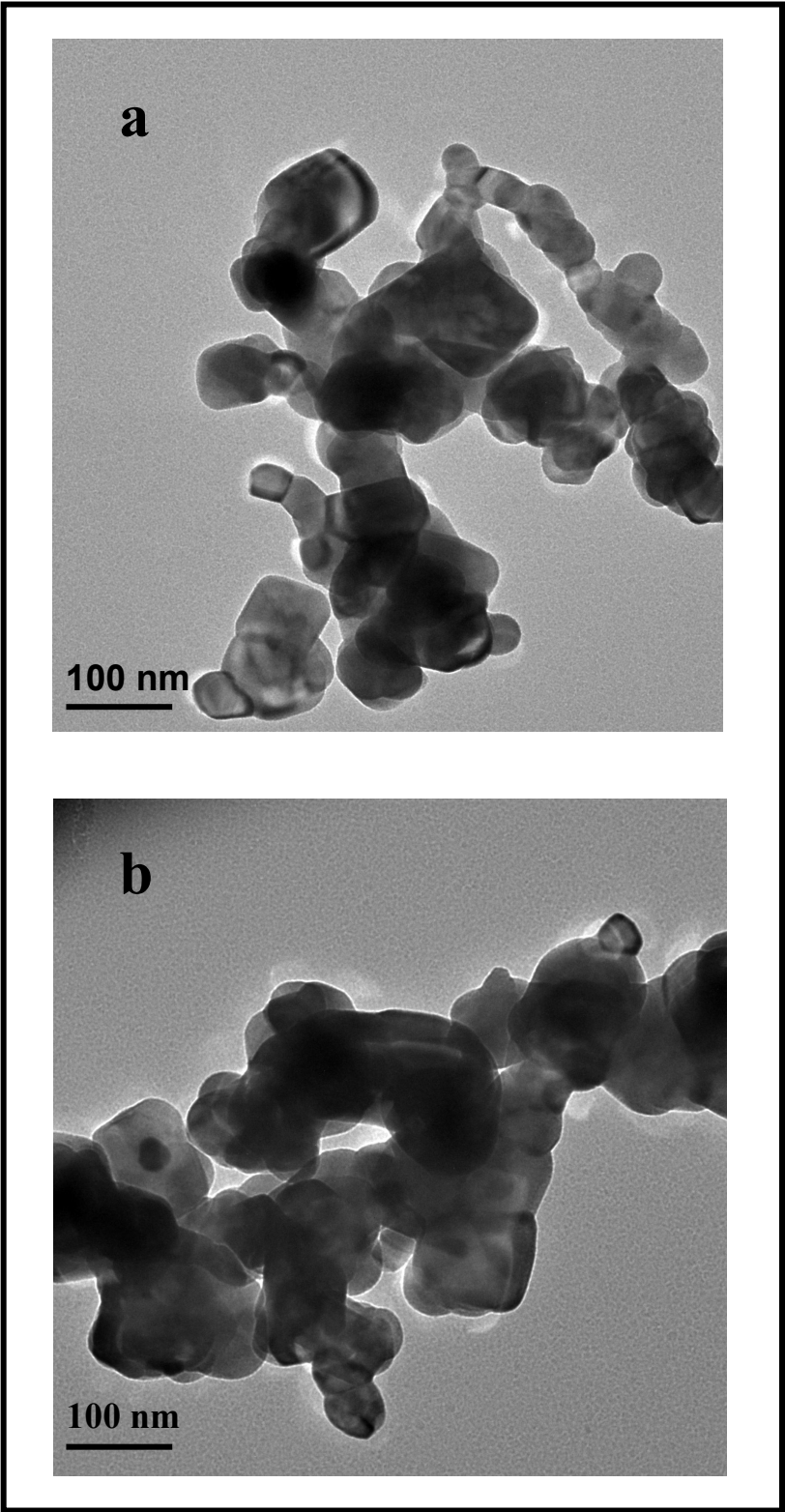


Figure 10

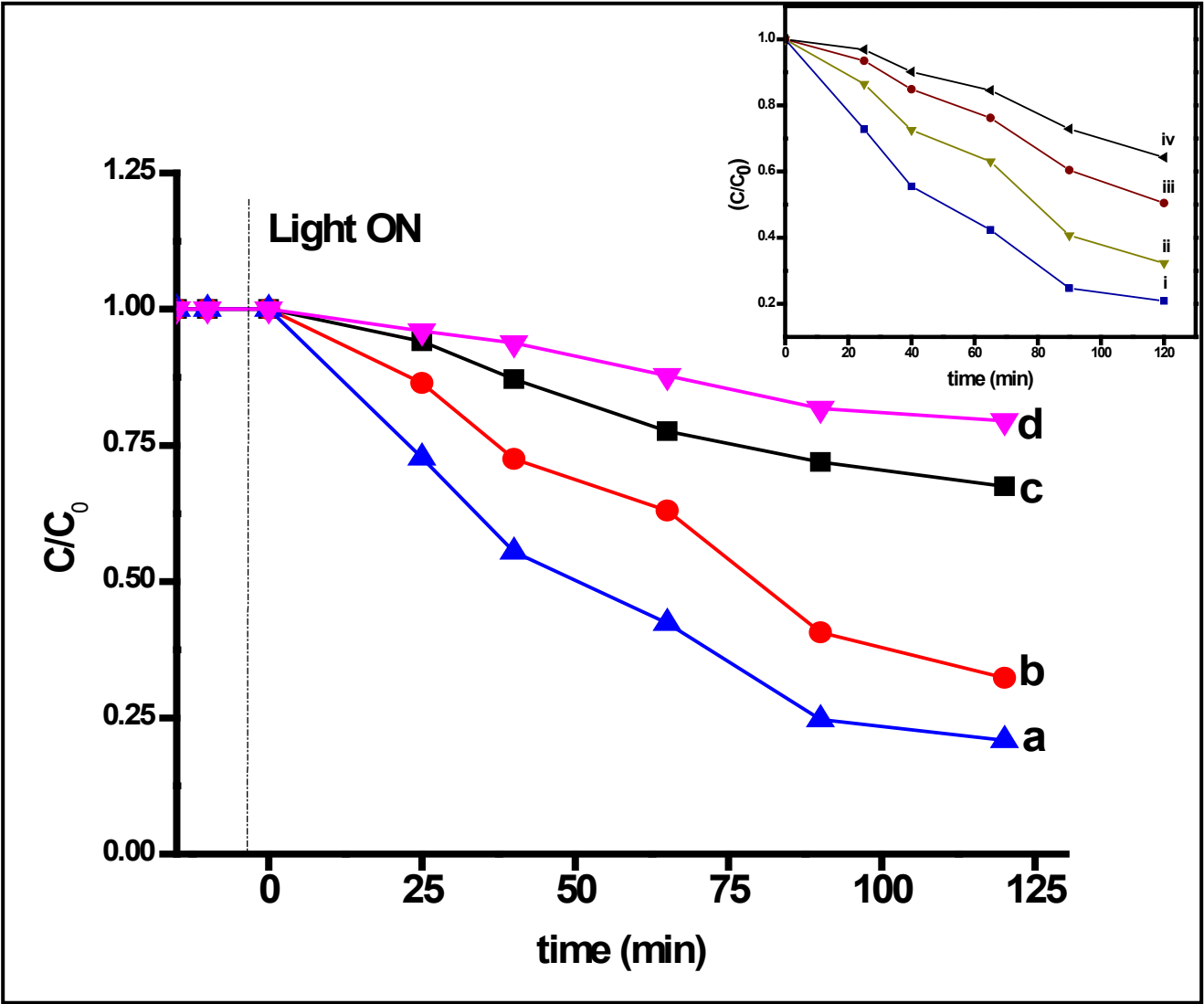


Figure S11

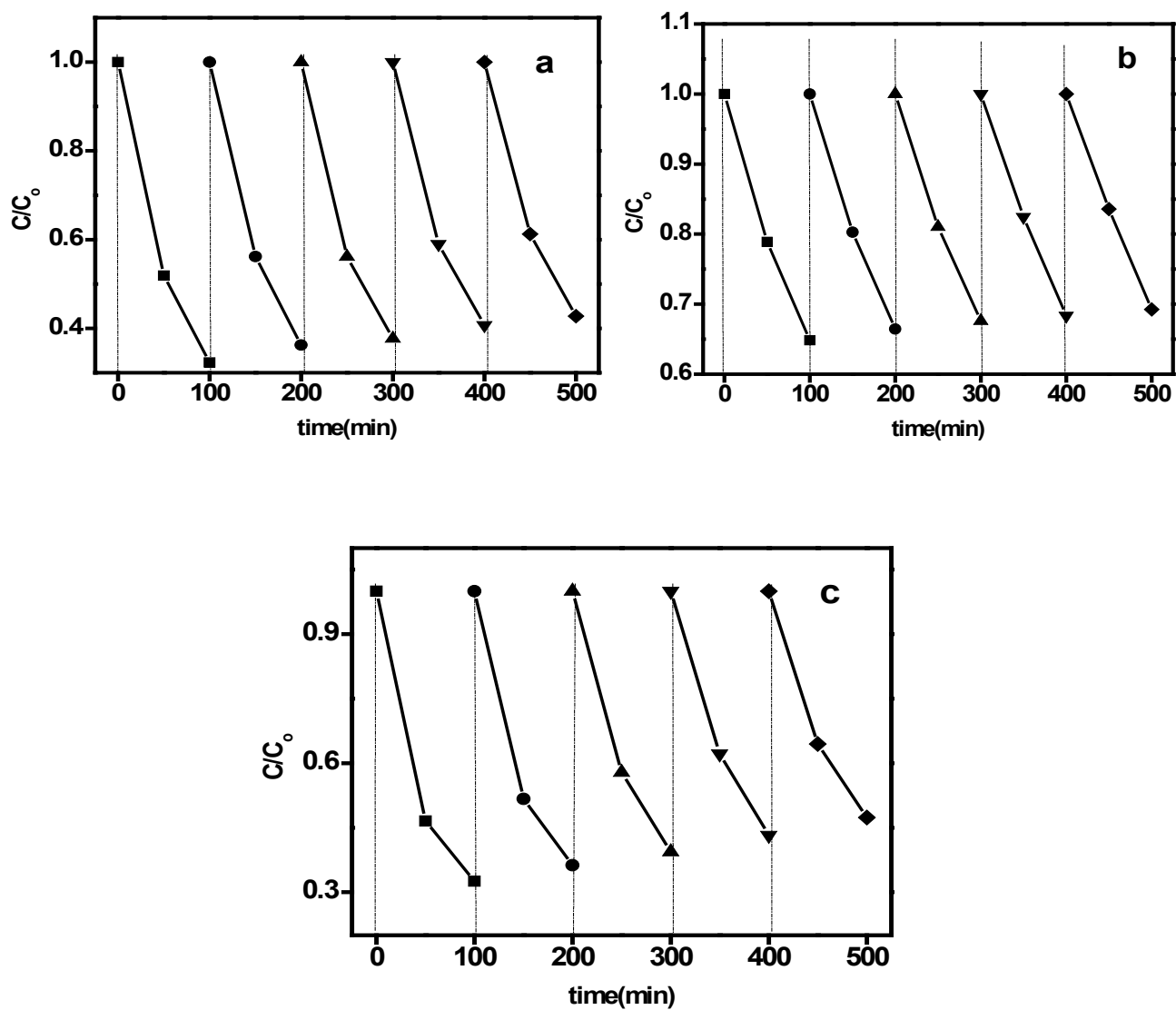


Figure S12

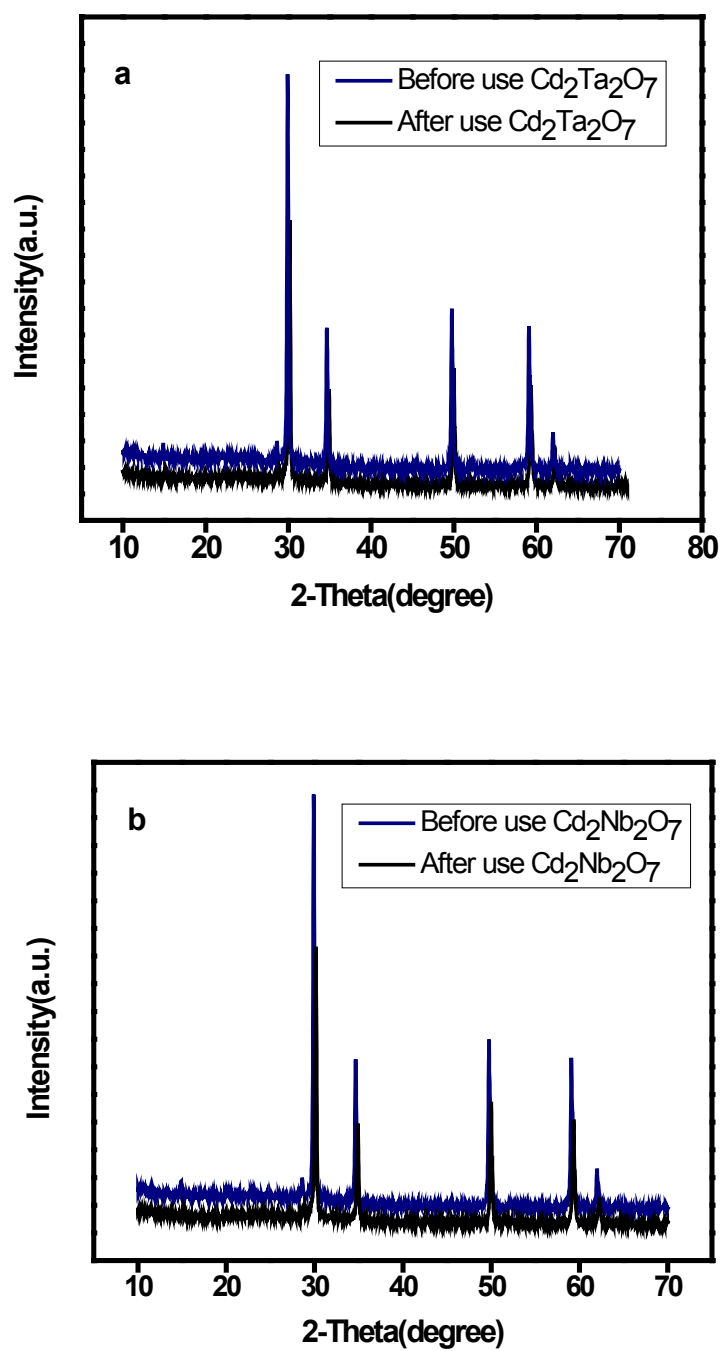


Figure S13