Supporting Information

A parallel array of Pt/Polyoxometalates composite nanotubes with stepwise inside diameter control and its application in catalysis

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Figure S1. All structures of the referring compounds.
Figure S2. UV–vis spectra of the as-prepared compositions: $\alpha$-$K_6P_2W_{18}O_{62}$ ($P_{2W_{18}}$), $Na_{12}P_2W_{15}O_{56} \cdot 18H_2O$ ($P_{2W_{15}}$) and $Na_9EuW_{10}O_{36} \cdot 32H_2O$ ($EuW_{10}$).

Figure S3. IR spectra of the as-prepared compositions: $\alpha$-$K_6P_2W_{18}O_{62}$ ($P_{2W_{18}}$), $Na_{12}P_2W_{15}O_{56} \cdot 18H_2O$ ($P_{2W_{15}}$) and $Na_9EuW_{10}O_{36} \cdot 32H_2O$ ($EuW_{10}$).
**Figure S4.** SEM images of PC membranes with an average pore diameter of about 200 nm

**Figure S5.** The EDX spectrum of the (P$_2$W$_{18}$/PAH)$_{15}$ tubes

**Figure S6.** The EDX spectrum of the (EuW$_{10}$/PAH)$_{15}$ tubes
Figure S7. The EDX spectrum of the (P$_2$W$_{15}$/PDDA)$_{15}$ tubes.

Figure S8. UV–vis spectra of (P$_2$W$_{18}$/PAH)$_n$ with $n$ = 0–15. The inset shows the absorbance at 200 and 280 nm as a function of $n$. 
Figure S9. UV–vis spectra of (EuW₁₀/PAH)ₙ with n = 0–15. The inset shows the absorbance at 195 and 260 nm as a function of n.

Figure S10. UV–vis spectra of (P₂W₁₅/PDDA)ₙ with n = 0–15. The inset shows the absorbance at 198 nm as a function of n.
Figure S11. Photoluminescence spectra of EuW\textsubscript{10} powder (a) and (EuW\textsubscript{10}/PAH)\textsubscript{n} nanotubes in solution (b) acquired at 298 K (\(\lambda_{ex} = 260\) nm).

Figure S12. XPS spectrum of Pt4f peak of Pt/POM nanotubes composites