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Supporting Information

## **Luminescent Layered Hybrid Ag-Ru/LDH as Photocatalytic Antibacterial Agent<sup>†</sup>**

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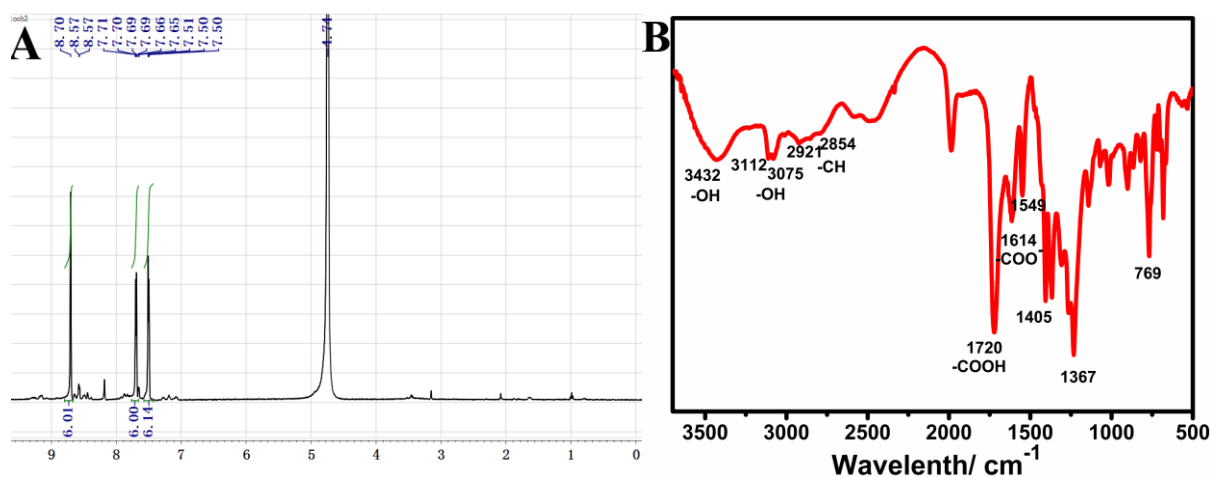
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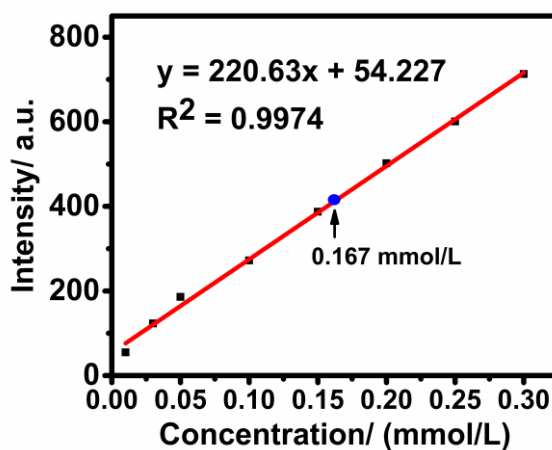
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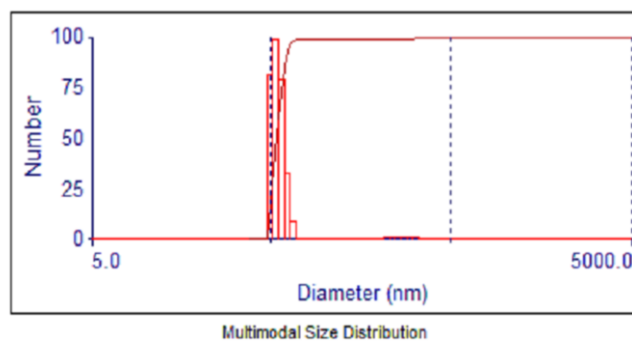
**Fig. S1** (A)  $^1\text{H}$  NMR spectra and (B) FTIR spectra of Ru complex.



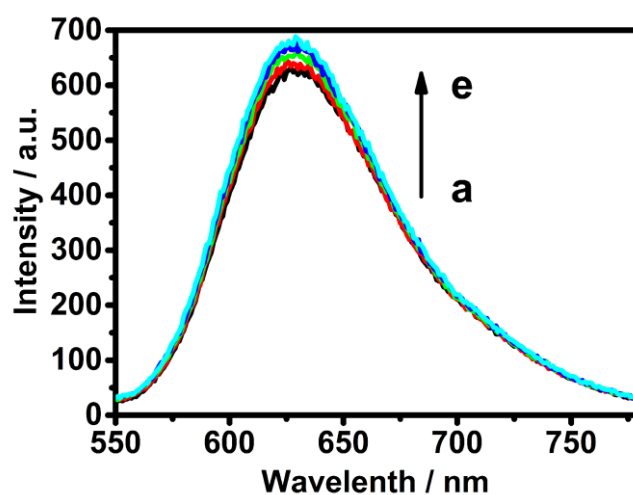
**Fig. S2** Quantitative analysis of Ru complex in the Ag-Ru/LDH hybrids. The amount of Ru was determined by measuring the Photoluminescence (PL) intensity of Ru at 630 nm. From the PL intensity of Ag-Ru/LDH (10 mg/ml), the content of Ru in the Ag-Ru/LDH was quantified to be 16.7 nmol/mg (0.17 % (w/w)).

$$C_{\text{Ru}} = 0.167 \text{ mmol/L} \div 10 \text{ mg/ml} = 16.7 \text{ nmol/mg}$$

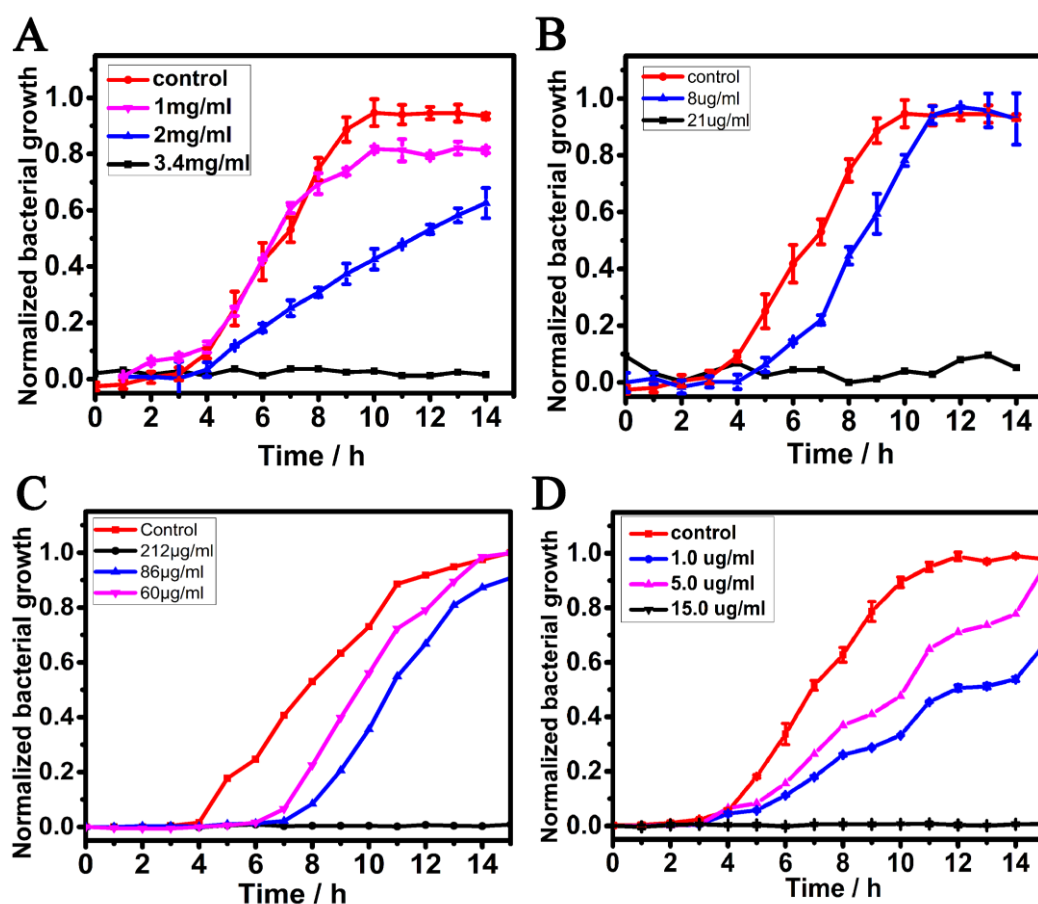
$$C_{\text{Ru}} = 16.7 \text{ nmol/mg} \times 101 \text{ g/mol} \times 100 \% = 0.17 \%$$



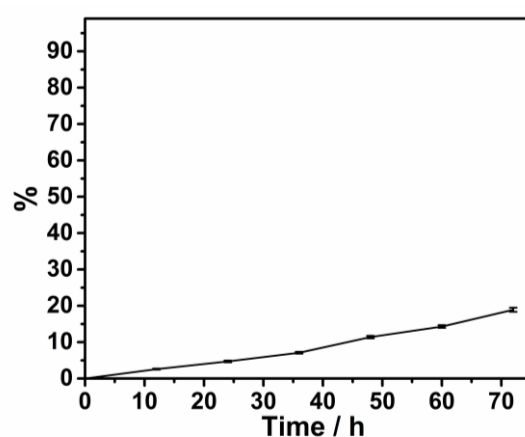
**Fig. S3** Dynamic Light Scattering measurement data of Ag-Ru/LDH.



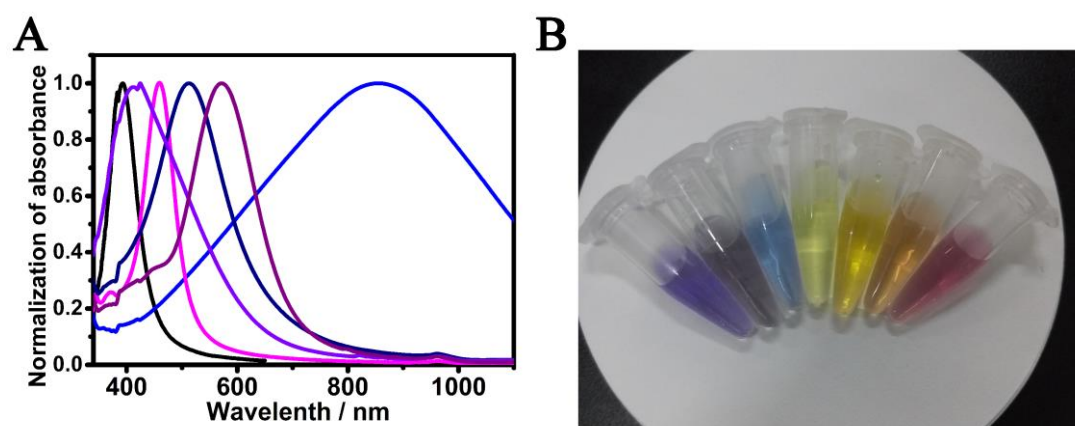
**Fig. S4** Fluorescence emission spectra of Ru/LDH titrated by varying concentrations of AgNPs in a pH 7 solution. The volumes of AgNPs solution were (a) 0, (b) 10  $\mu\text{L}$ , (c) 20  $\mu\text{L}$ , (d) 30  $\mu\text{L}$ , (e) 40  $\mu\text{L}$ .



**Fig. S5** Bacterial growth curve of (A) *E. coli* and (C) *S. aureus* in LB liquid medium in the presence of different concentration of Ru/LDH in light. Bacterial growth curve of (B) *E. coli* and (D) *S. aureus* in LB liquid medium in the presence of different concentration of AgNPs.



**Fig. S6** The Ru release property of Ag-Ru/LDH hybrid. A dialysis bag of Ag-Ru/LDH were immersed and shaken in PBS solution (pH 7.4) at 37 °C. The concentration of Ru is determined by the emission intensity of Ru.



**Fig. S7** UV-*vis* spectra (**A**) and images (**B**) of AgNPs.