## Supporting information

## Engineering a polyvinyl alcohol microspheres with functions of

photothermal/chemodynamic therapy for enhanced transarterial

## chemoembolization

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**Figure S1** The element mapping of the obtained PVA@MIT@PPY@Fe<sub>3</sub>O<sub>4</sub>



Figure S2 (a) UV-vis-NIR spectrum and (b) FT-IR spectroscopy of the intermediates of the PVA@MIT@PPY@Fe $_{3}O_{4}$ 



**Figure S3** Photothermal performance of the water, PVA, PVA@MIT, PVA@MIT@PPY and PVA@PPY@Fe<sub>3</sub>O<sub>4</sub> under the laser irradiation (at 1.0 W/cm<sup>2</sup>) for 900 second. The concentration for PVA and each nanoparticle is 2.5 mg/mL.



Figure S4 CDT performance. Picture and corresponding absorbance of the ①PBS,

②PVA, ③PVA@MIT, ④PVA@MIT@PPY,⑤PVA@PPY@Fe<sub>3</sub>O<sub>4</sub>,

O PVA@MIT@PPY@Fe<sub>3</sub>O<sub>4</sub> mixed with MB at 25 (a, b) and 55 °C (c,d).



**Figure S5** Synergy therapy performance of PMPF microspheres in vitro. Confocal images of the cells dyed by AM (green color) and PI (red color) after being treated by different conditions for PBS, PVA, PVA@MIT, PVA@MIT@PPY, PVA@PPY@Fe<sub>3</sub>O<sub>4</sub> group.



**Figure S6** (a) Thermal images and (b) corresponding temperatures at the tumor site of rats in the different groups before and after laser irradiation at different time points (1-5 min).