Electronic Supplementary Information (ESI)

Electrospun Flexible Janus Nanoribbons Array Endowed with Simultaneously Tuned Trifunctionality of Electrically Conductive Anisotropy, Photoluminescence and Magnetism

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Preparation of PMMA

0.1000 g of BPO and 100 mL of MMA were added into a 250-mL three-necked flask with a backflow device and stirred vigorously at 90-95 °C. When the viscosity of the mixture solution reached that of glycerol, the heating was stopped and the mixture was naturally cooled to room temperature. The obtained gelatinous solution was loaded into test tubes, and the influx height was 5-7 cm. Then the tubes were put in an electric vacuum oven at 50 °C for 48 h, and the gelatinous solution was solidified. Finally, the temperature was raised to 110 °C for 2 h to terminate the reaction in the oven.

Synthesis of $Dy(BA)_3$phenand $Eu(BA)_3$phen complexes

$Dy(BA)_3$phen powders were synthesized according to the traditional method as described in the reference[36]. 1.8775 g of Dy_2O_3 was dissolved in 10 mL of concentrated nitric acid and then crystallized via evaporation of excess nitricacid and water by heating, and $Dy(NO_3)_3 \cdot 6H_2O$ powders were acquired. $Dy(NO_3)_3$ ethanol solution was prepared by adding 20 mL of anhydrous ethanol into the above $Dy(NO_3)_3 \cdot 6H_2O$. 3.6640 g of BA and 1.8020 g of phen were dissolved in 200 mL of ethanol. The $Dy(NO_3)_3$ ethanol solution was then added into the mixed solution of BA and phen with magnetic agitation for 3 h at 60 °C. The precipitates were collected by filtration and dried at 60 °C for 12 h. The synthetic method of $Eu(BA)_3$phen complexes was similar to the above method, except that the using dosages of Eu_2O_3, BA and phen were 1.7596 g, 3.6636 g and 1.9822 g, respectively.

Preparation of oleic acid modified Fe_3O_4 NPs

Fe_3O_4 NPs were obtained *via* a facile coprecipitation synthetic method, and PEG

was used as the protective agent to prevent the particles from aggregation. One typical synthetic procedure was as follows: 5.4060 g of $FeCl_3 \cdot 6H_2O$, 2.7800 g of $FeSO_4 \cdot 7H_2O$, 4.0400 g of NH_4NO_3 and 1.9000 g of PEG were added into 100 mL of deionized water to form uniform solution under vigorous stirring 50 °C. To prevent the oxidation of Fe^{2+}, the reactive mixture was kept under argon atmosphere. After the mixture had been bubbled with argon for 30 min, 0.1 $mol \cdot L^{-1}$ of $NH_3 \cdot H_2O$ was dropwise added into the mixture to adjust the pH value above 11. Then the system was continuously bubbled with argon for 20 min at 50 °C, and black precipitates were formed. The precipitates were collected from the solution by magnetic separation, washed with deionized water for three times, and then dried in an electric vacuum oven for 12 h at 60 °C.

To improve the monodispersity, stability and solubility of Fe_3O_4 NPs in the spinning solution, the as-prepared Fe_3O_4 NPs were then coated with oleic acid (OA) as below: 2.0000 g of the as-prepared Fe_3O_4 NPs were ultrasonically dispersed in 100 mL of deionized water for 20 min. The suspension was heated to 80 °C under argon atmosphere with vigorous mechanical stirring for 30 min and then 1 mL of OA was dropwise added. Reaction was stopped after heating and stirring the mixture for 40 min. The precipitates were collected from the solution by magnetic separation, washed with ethyl alcohol for three times, and then dried in an electric vacuum oven at 60 °C for 6 h.

The morphology of the as-prepared Fe_3O_4 NPs was observed by means of transmission electron microscopy (TEM), as presented in Figure S1. The saturation magnetization of Fe_3O_4 NPs is 35.31 $emu \cdot g^{-1}$, as seen in Figure S2.

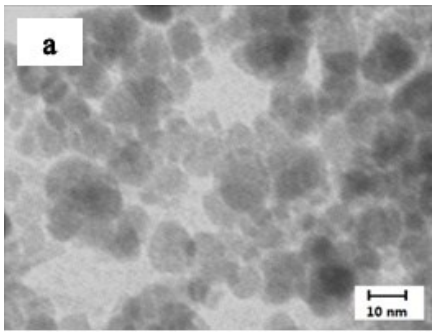

Figure S1 TEM image of Fe_3O_4 NPs

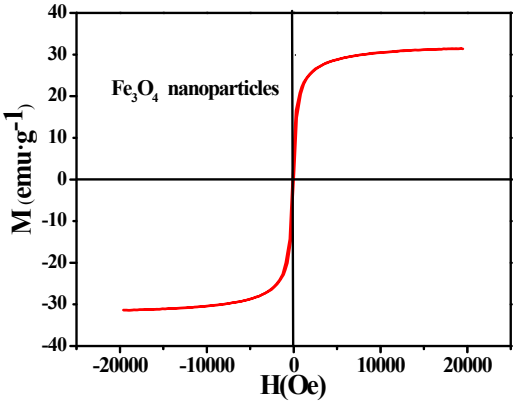

Figure S2 Hysteresis loops of the Fe_3O_4 NPs