## **Supporting Information**

Controlled synthesis of Au-loaded  $Fe_3O_4@C$  composite microspheres with superior SERS detection and catalytic degradation abilities for organic dyes

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Fig. S1 The histogram of particle size distribution for Fe<sub>3</sub>O<sub>4</sub>@C microspheres.



Fig. S2 TEM images and EDS datas of Au-loaded  $Fe_3O_4@C$  composite microspheres prepared with different

feeding amount of solutions of Au NPs (a-b)30 mL, (c-d) 40 mL, (e-f) 50 mL.