Electronic Supplementary Information (ESI)

Facile Synthesis and Shape Control of Fe_3O_4 Nanocrystals with Well Dispersion and Stabilization

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1. The Fe_3O_4 nanocrystals prepared at 290 °C

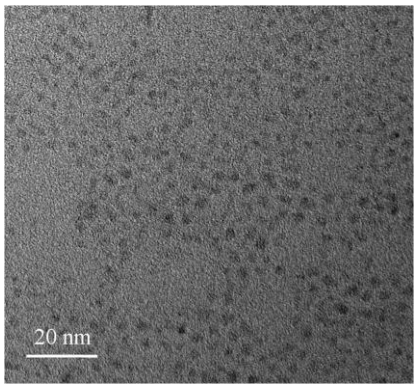

Figure S1. TEM image of the Fe_3O_4 nanocrystals prepared at 290 °C

The pre-prepared 5 g of $Fe(oleate)_3$, 50 mL of paraffin oil and 0.5 g of PIBSI were mixed and magnetically stirred under protection N_2 in a three necked flask and heated firstly to 150°C for 1 h, and then heated to 290 °C with a heating rate of 10 °C/min and maintained at this temperature for 2 h under N_2 flow with continuous stirring. In this case, the product has small size about 2 nm and poor crystallinity (Figure S1).

2.paraffin based magnetic fluid (cubic Fe_3O_4 NCs) used in loudspeaker

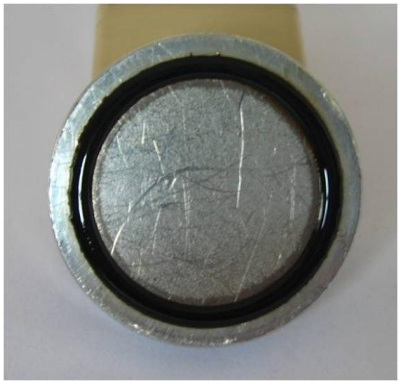

Figure S2. Photographs of loudspeaker use paraffin based magnetic fluid (cubic Fe_3O_4 NCs) with 1 T

Magnet used in loudspeaker has developed from ferrite magnets to strong NdFeB magnets, which requires the magnetic fluid used in loudspeaker ultrastable. It can be

drown from Figure S2 that the magnetic NCs are not separated under longtime strong magnetic field; it proves the stability of the paraffin based magnetic fluid and can be used in loudspeaker.

3. Cubic Fe_3O_4 dispersed in diferrent carrier

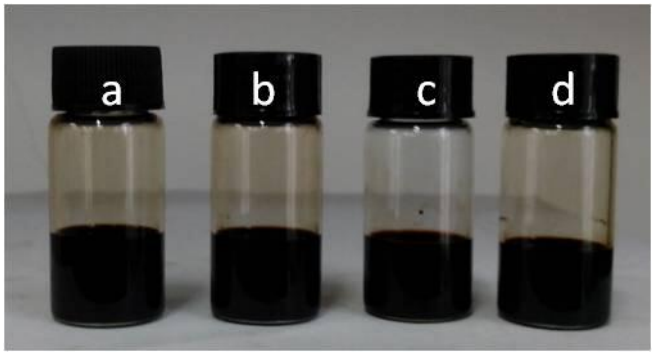

Figure S3. Photographs of cubic Fe_3O_4 dispersed in diferrent carrier (a) hexane (b) paraffin (c) polyalphaolefin (PAO-40) (d) polyisobutene (PB450)

Cubic Fe_3O_4 magnetic fluid is transferred to a 50 mL centrifuge tube, together with a 20 mL mixture of ethanol and hexane with a volume ratio of 1 : 2. Different shapes of NCs in the form of black powders are obtained by centrifugation at 8000 rpm for 5 min. And respectively redispersing them in hexane, polyalphaolefin (PAO-40) and polyisobutene (PB450, molecular weight 450) to obtain different kinds of magnetic fluids.

PIBSI coated cubic Fe_3O_4 NCs have super dispersibility. The polar heads of PIBSI attach themselves to the Fe_3O_4 NCs, while the long (non-polar) hydrocarbon tails keep PIBSI suspended in either low or high-boiling point solutions. In this paper, paraffin based magnetic fluids have been prepared by coating the Fe_3O_4 NCs with PIBSI through one-pot method according to this performance. Therefore, the magnetic fluids prepared in this method have the advantage of simple, low cost and long-term stability.

4. **Diferrent shapes of Fe_3O_4 NCs dispersed in paraffin**

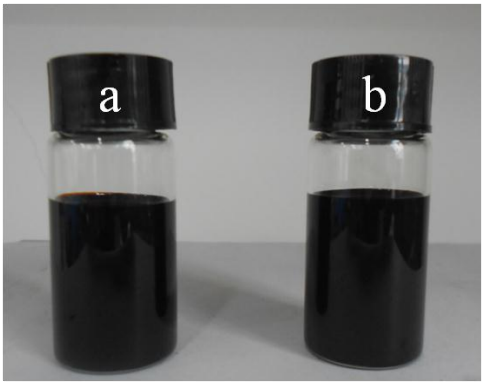

Figure S4. Different shapes of Fe_3O_4 NCs dispersed in paraffin. (a) cuboctahedral (b) octahedral

Shape-controlled Fe_3O_4 NCs are well dispersed in paraffin oil to obtain magnetic fluids. And the stability test of cuboctahedral and octahedral Fe_3O_4 magnetic fluids shows that they could be stable at room temperature for more than 90 days and the Fe_3O_4 NCs (Figure S4) does not precipitate. The polar heads of the PIBSI attach themselves to the Fe_3O_4 magnetic NCs, while their long non-polar hydrocarbon tails keep PIBSI well suspended in paraffin. That is the reason why the magnetic fluids of PIBSI coated Fe_3O_4 NCs can keep stable for such a long time.