SUPPORTING INFORMATION

Effect of Chitosan Molecular Weight on CO_2-Triggered Switching between Emulsification and Demulsification

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Tab. S1. Molecular weight of 4 chitosan samples.

Sample	Mn(g/mol)	Mw(g/mol)	PD
3×10^3 Da CTS	3127	3280	1.05
2×10^4 Da CTS	19540	20910	1.07
5×10^4 Da CTS	51008	54541	1.07
2×10^5 Da CTS	190330	218000	1.15

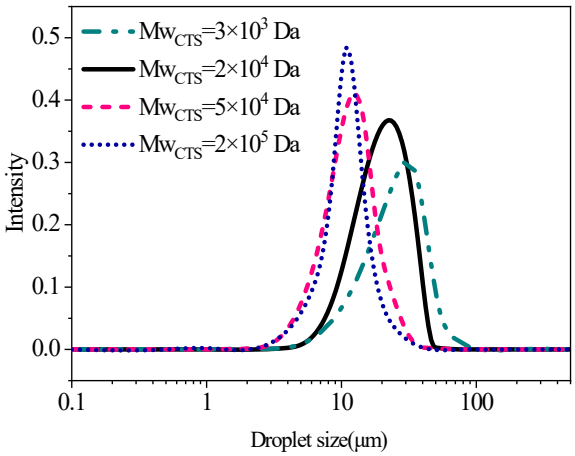

Fig.S1. Droplet distribution curves of emulsions stabilized by chitosan products with different molecular weight.

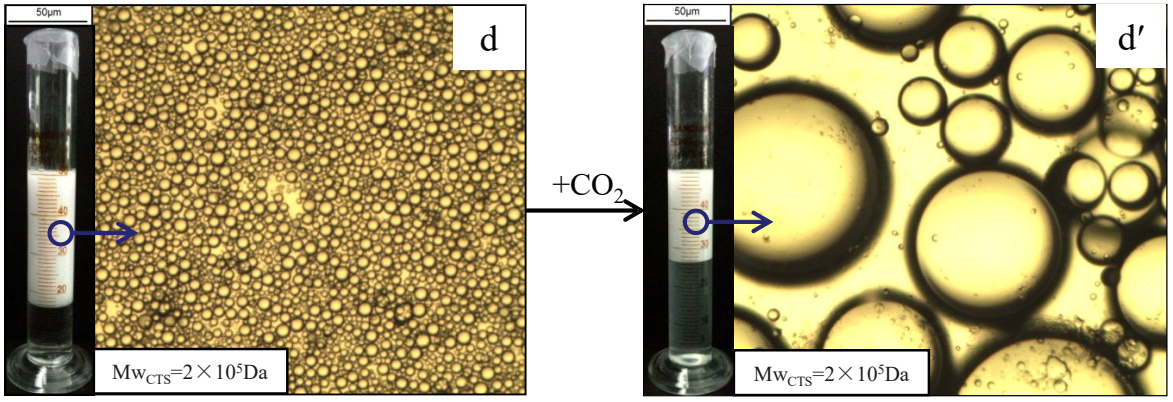

Fig.S2. Optical micrographs of the emulsions stabilized by CTS sample with molecular weight of 2×10^5 Da. Insets are digital photographs of the corresponding emulsions.

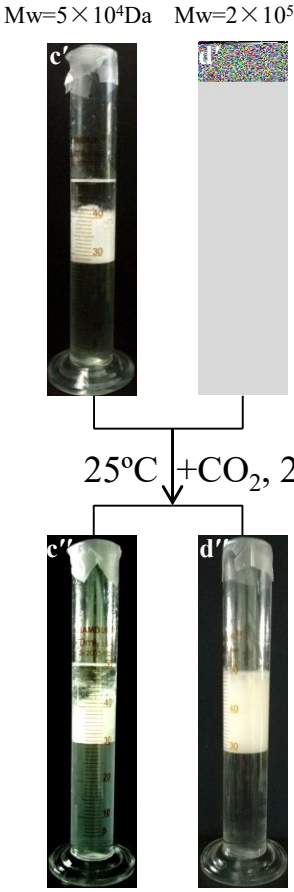

Fig.S3. CO_2-switched demulsification of the emulsions formed by CTS with the molecular weight of 5×10^4 Da and 2×10^5 Da after an extra 2 hours of bubbling CO_2。

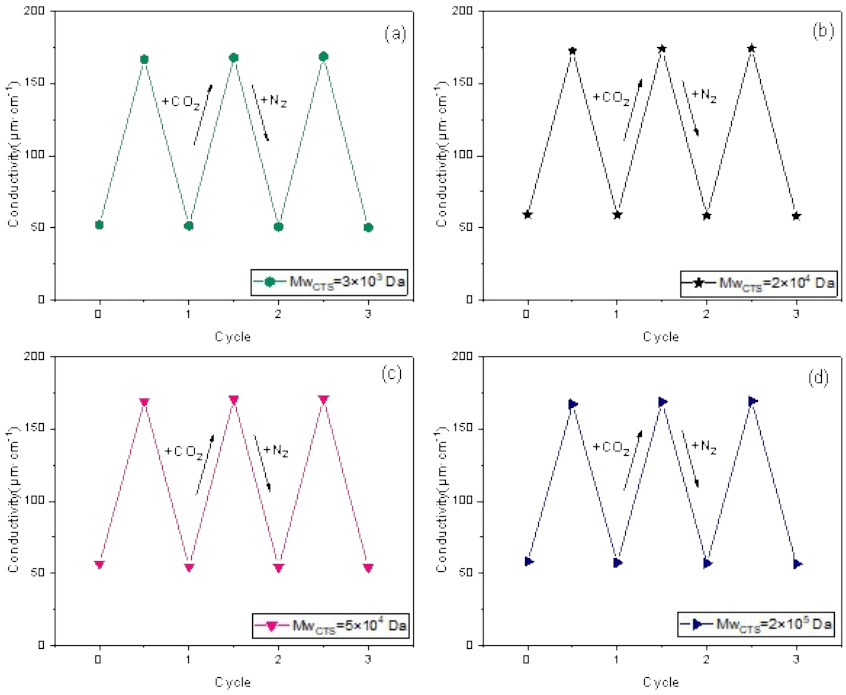

Fig.S4. Conductivities during repeated cycles of CTS samples with different molecular weight under CO_2/N_2.

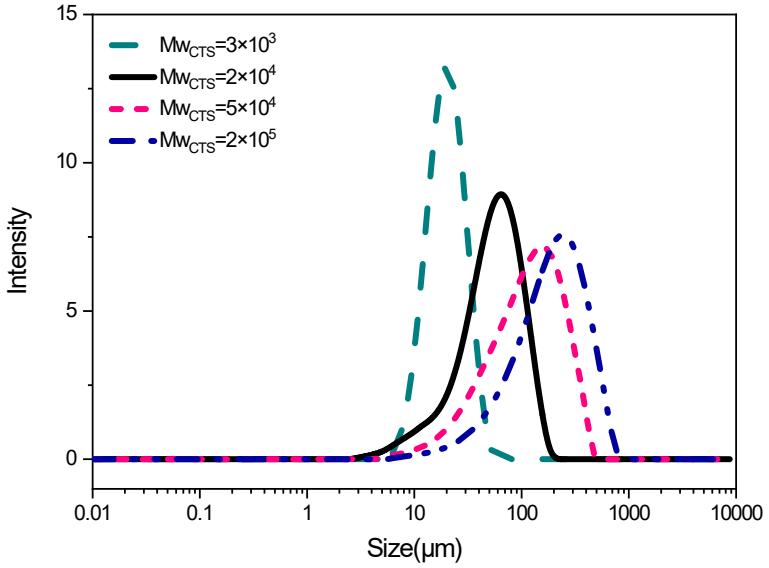

Fig. S5. Size distribution of chitosan with different molecular weights.

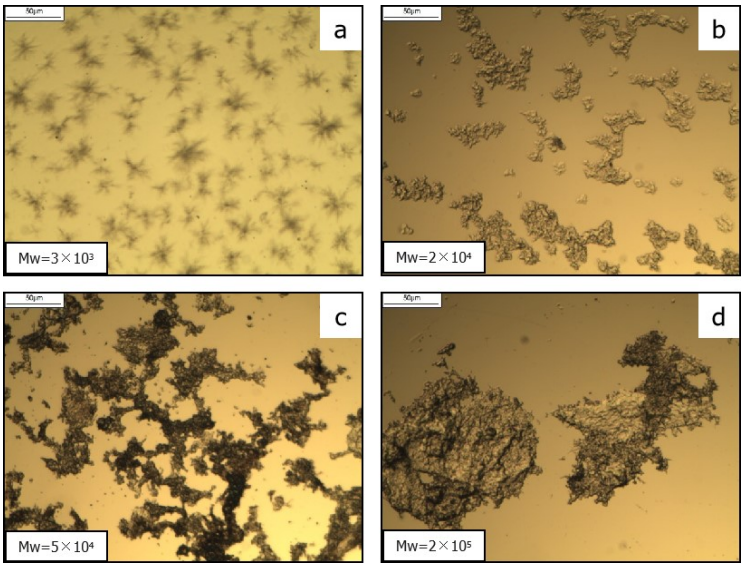

Fig. S6. Optical micrographs of CTS samples with different molecular weight.

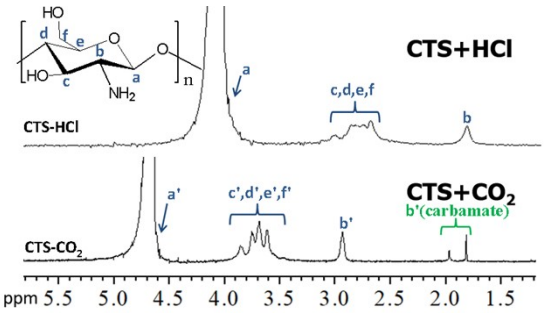

Figure S7. The ^{1}HNMR of CTS-HCl (upper) and CTS-CO_2 (lower)

The measurements of ^{1}H NMR illustrate that the products in the stimulation of HCl and CO_2 are different. As shown in **Fig.S7**, compare with the ^{1}H NMR spectrum of CTS-HCl, all the H

peaks shift to lower fields in the ^{1}H NMR spectrum of CTS-CO_2; meanwhile, new peaks at 1.80 ppm and 1.95 ppm appears in the ^{1}H NMR spectrum of CTS-CO_2 which belongs to the -NHC(O)OH protons, represents clear evidence for CTS-carbamates formation.[1]

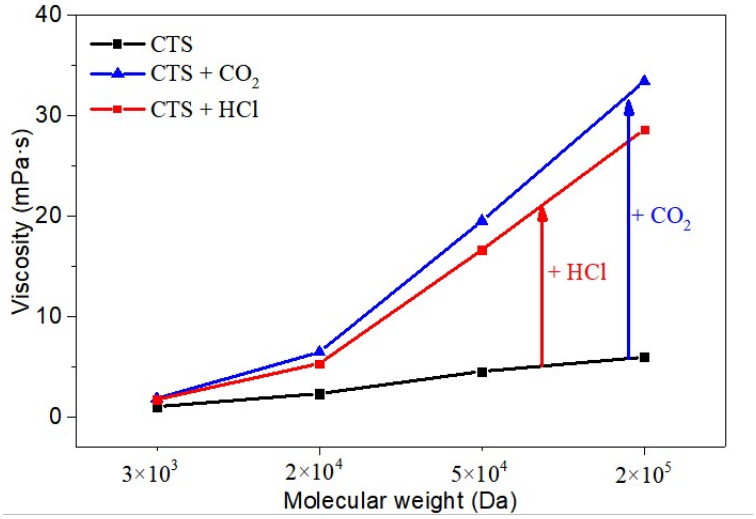

Fig.S8. The viscosity of CTS samples with different molecular weight treated by bubbling CO_2 and adding hydrochloric acid solution (0.01M).

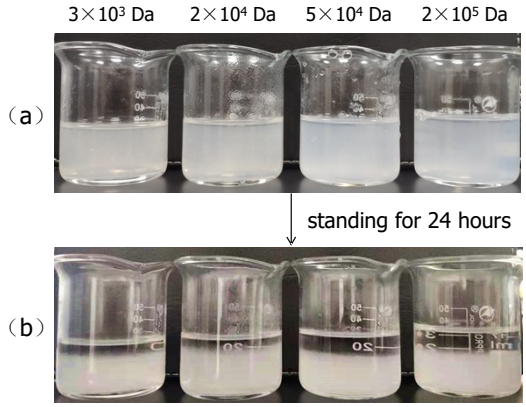

Fig. R1 Photographs of CTS aqueous solutions freshly prepared (a) and after standing for 24 h (b), with molecular weight of CTS being given on top.

Fig. R1 (b) shows the precipitates of CTS at the bottom of the beakers after 24-h standing of the solution, in contrast to milky dispersion of CTS aggregates in the freshly prepared aqueous solutions as shown in **Fig. R1 (a)**.

1. V. Stastny, A. Anderson and D. M. Rudkevich, *Journal Of Organic Chemistry*, 2006, **71**, 8696-8705.