Electronic Supplementary Material (ESI) for RSC Advances.

Effects of Alkanethiols Chain Length on Synthesis of $Cu_{2-x}S$ Nanocrystals: Phase, Morphology, Plasmonic Properties and Electrical Conductivity

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Fig. S1

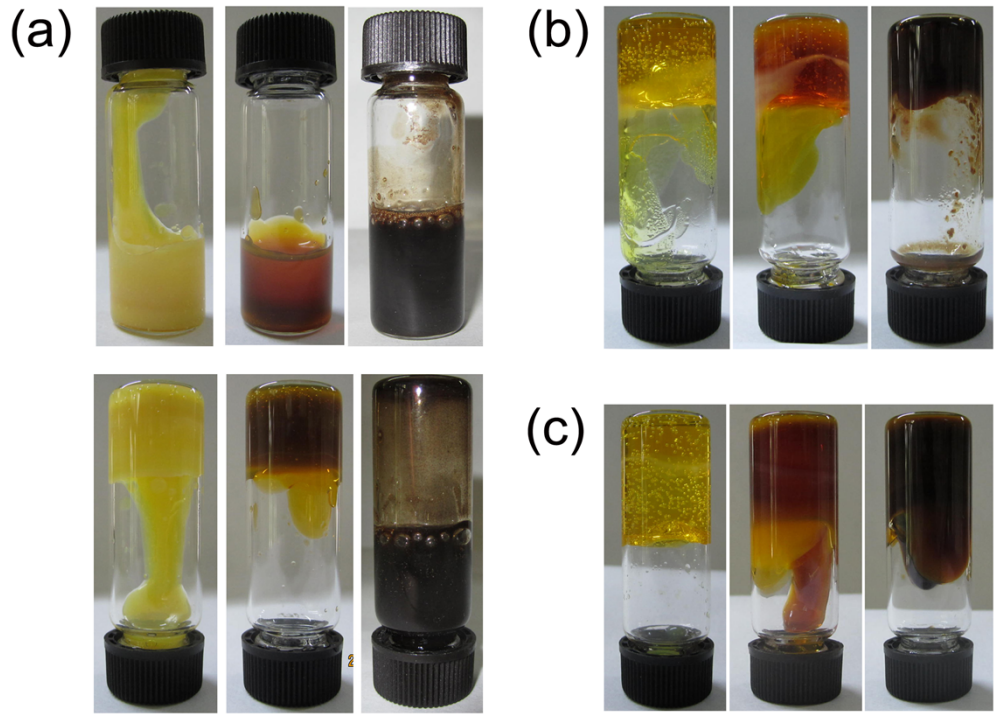

Fig. S1. Digital pictures of Cu-thiolate compounds at the initial stages by using different alkanethiols with different alkyl length, (a) 1-OT; (b)1-DDT; (c)1-ODT.

Fig. S2

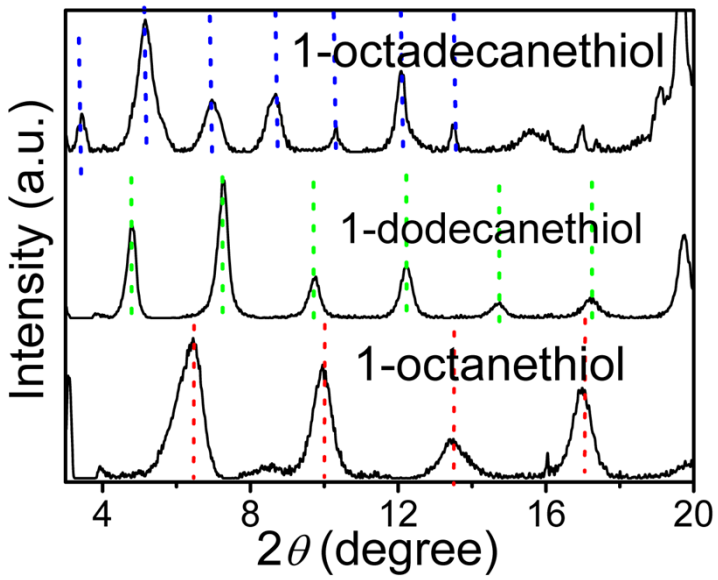

Fig.S2 XRD patterns of the Cu-thiolate compounds by using different alkanethiols.

Fig. S3

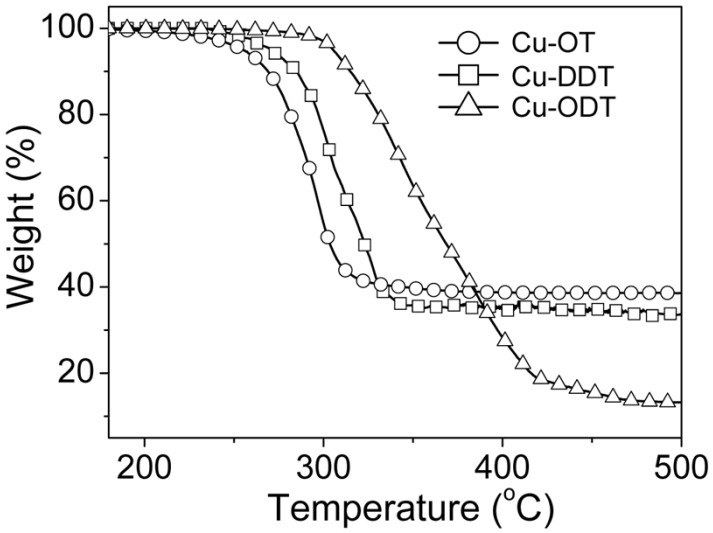

Fig. S3 TGA curves of the Cu-thiolate compounds by using different alkanethiols

Fig. S4

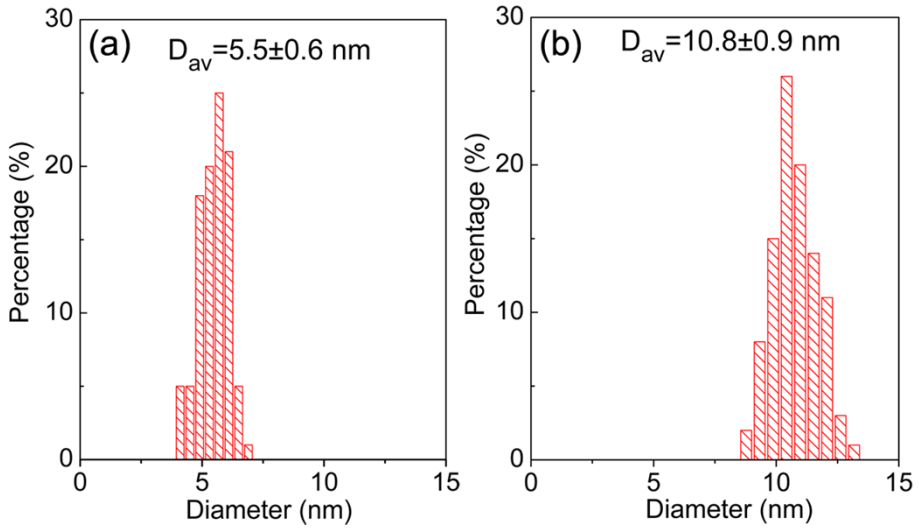

Fig. S4 Size distribution histograms of (a) sample A and (b) sample B obtained at 240 mins.

Fig. S5

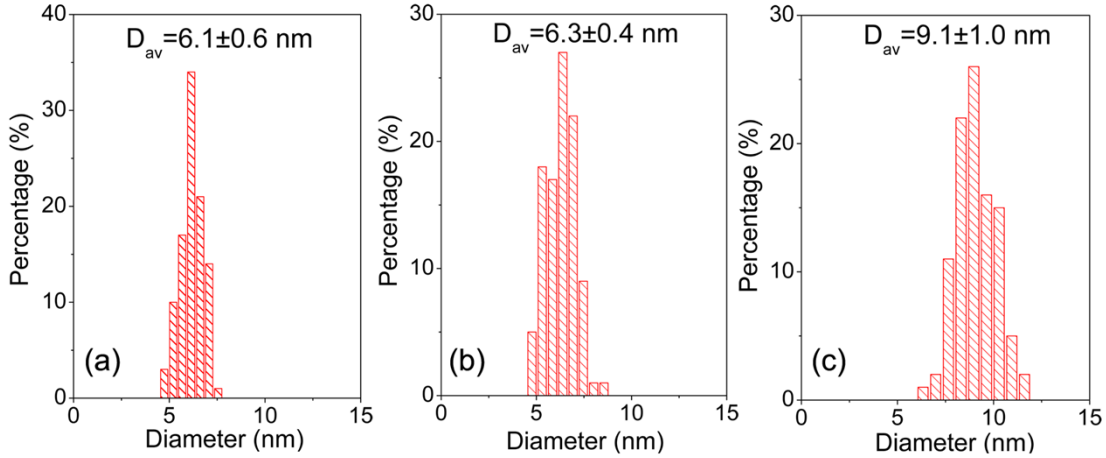

Fig. S5 Size distribution histograms of sample C obtained at different reaction time: (a) 90 min; (b) 120 min; (c) 240 min.

Fig. S6

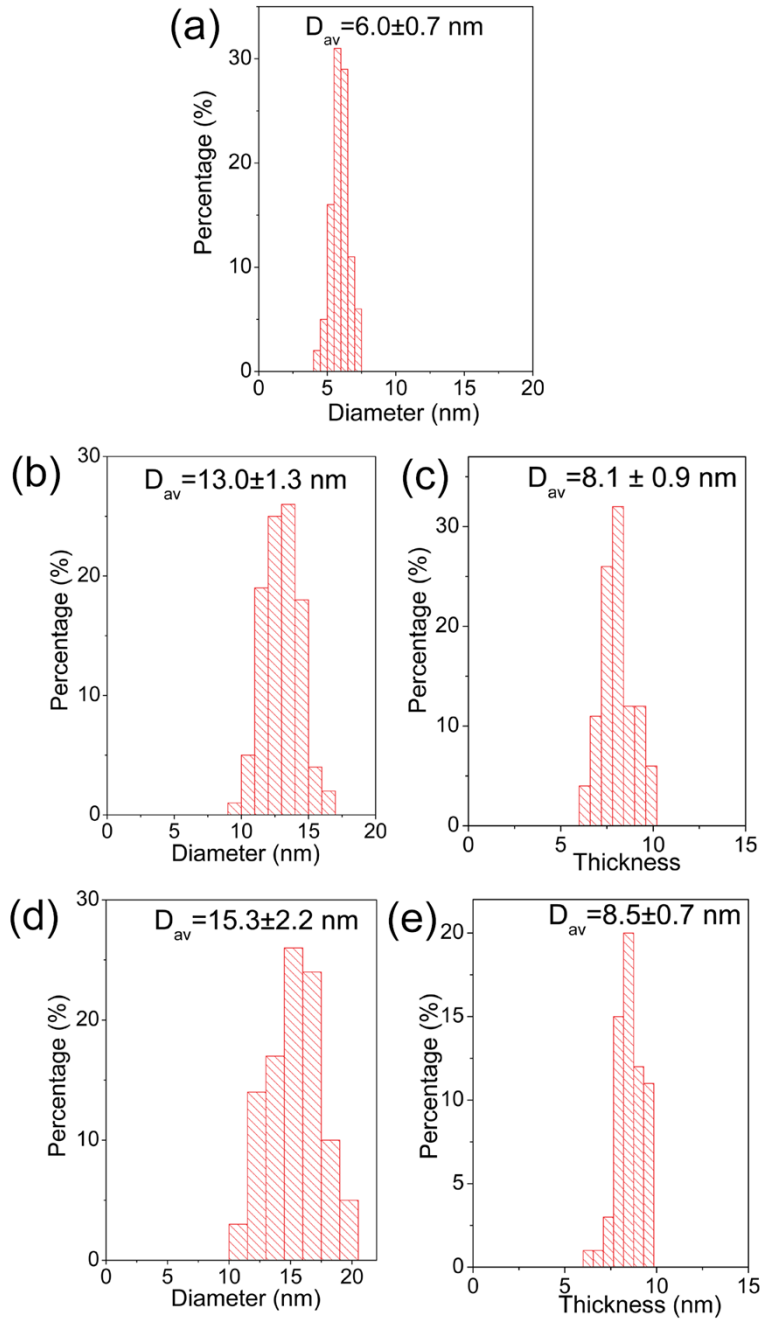

Fig. S6 Size distribution histograms of diameter and thickness for sample D obtained at different reaction time: (a) 90 min; (b) diameter and (c) thickness at 180 min and (d) diameter and (e) thickness at 240 min.

Fig. S7

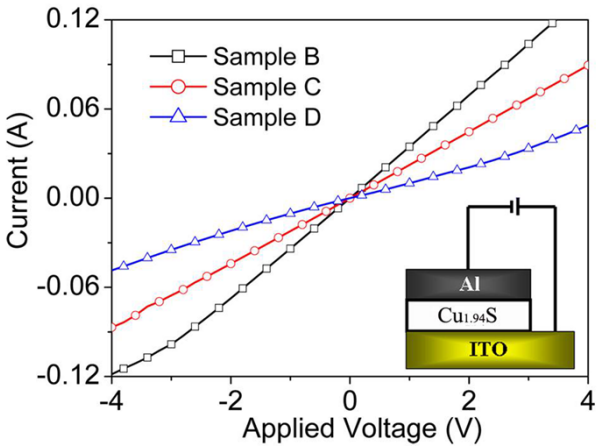

Fig. S7 *I-V* curves of the $Cu_{2-x}S$ film with the ITO/$Cu_{2-x}S$/Al structure using sample B-D obtained at 60 min.