Electronic Supplementary Material (ESI) for RSC Advances.

MnS nanocomposites based on doped graphene: simple synthesis by wet chemical route and improved electrochemical properties as electrode material for supercapacitors

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Preparation of Graphene Oxide (GO)

Graphene oxide was prepared through modified Hummer's method according to the previous literature.[24] Graphite powder (0.5 g) and sodium nitrate (0.5 g) were mixed with 23 ml of concentrated sulfuric acid (98% pure) under stirring in an ice bath. After four hours, potassium permanganate (3 g) was added into the mixture. The reaction mixture was maintained at 35°C for two hours with continuous stirring in water bath, which was later diluted with 46 ml of water. After that, the temperature was raised to 98°C and maintained for two hours. Then the reaction mixture was diluted with 100 ml warm (50^{o}C) water and 10 ml hydrogen peroxide under stirring. After 1 hour, the solution turned light yellow in color. The powders were collected after repeated washing in deionized water by centrifugation and the collected powder was dried at 60°C for 24 h.

Preparation of Graphene

Graphene was synthesized using sodium borohydride as a reducing agent.[25] Initially, GO (40 mg) and water (40 ml) were ultrasonicated for 1 hour. Then, this GO dispersed water was taken in an airtight container (60 ml capacity). Then, it was added with sodium borohydride (0.24 g) and 5 ml of 1M sodium hydroxide solution. The mixture was kept at 90°C for 1 hour. After cooled to room temperature, the powder was separated by centrifuging at 7500 rpm. Finally the powder was dried at 60°C for 24 hrs.

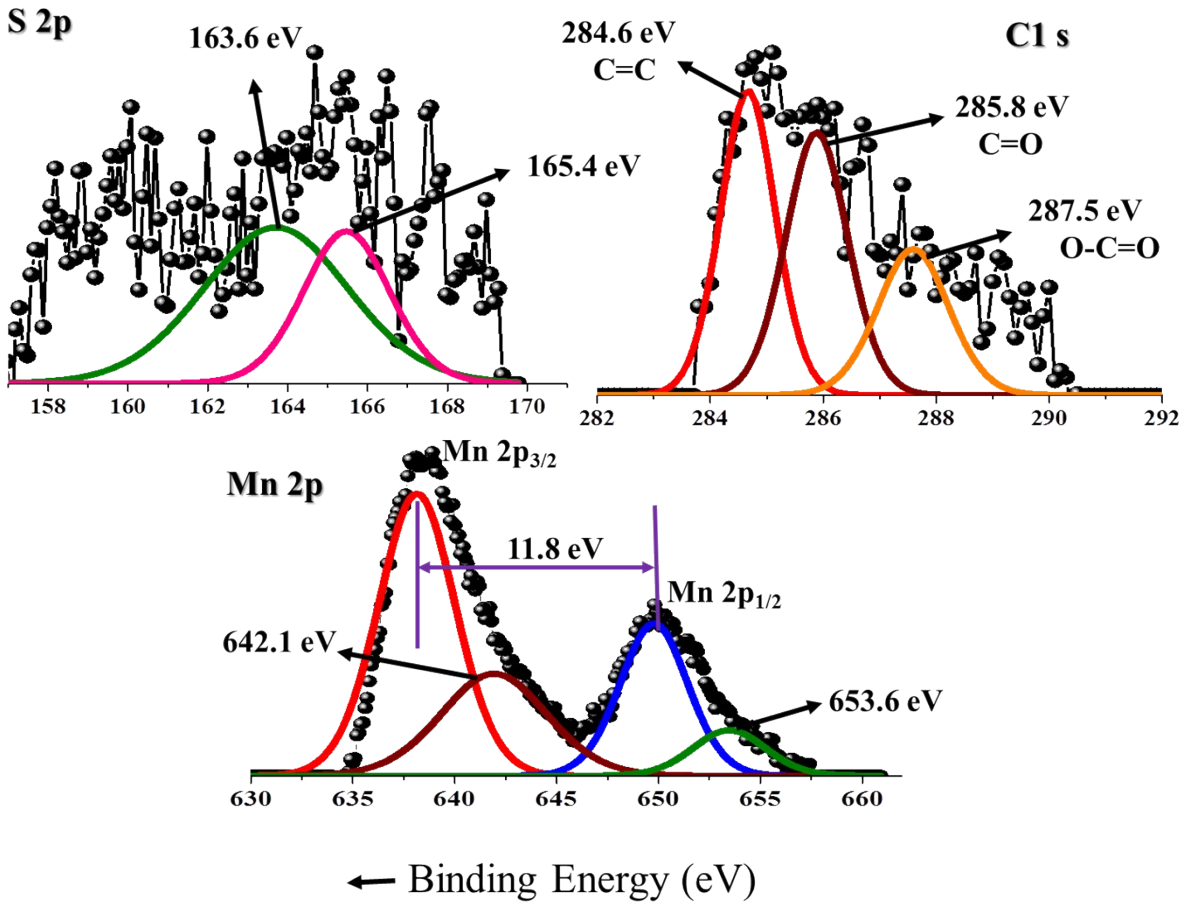

Fig. S1 Core level XPS spectrum of S2p, C1s and Mn2p of MnS/G-9 nanocomposite

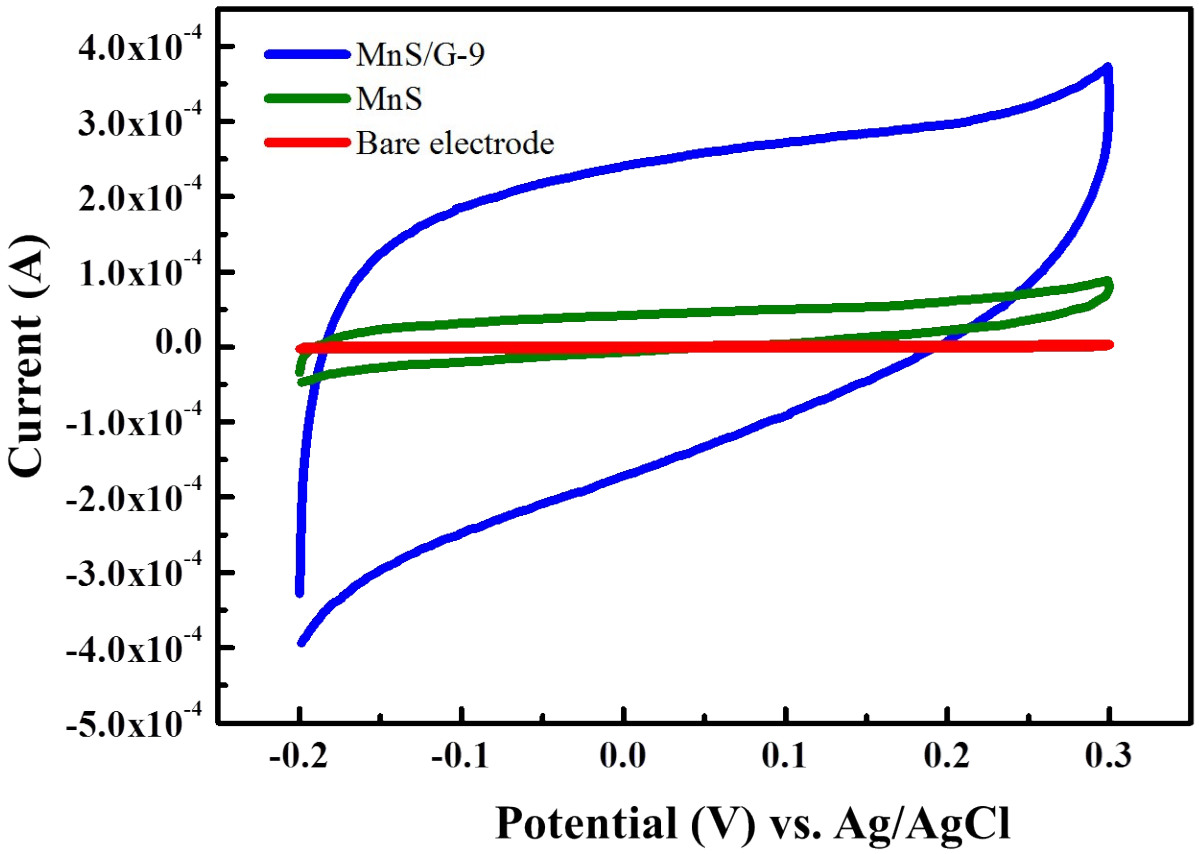

Fig. S2 Comparison of CV curve of bare carbon electrode, MnS/G-9 and pure MnS at 100 mV scan rate

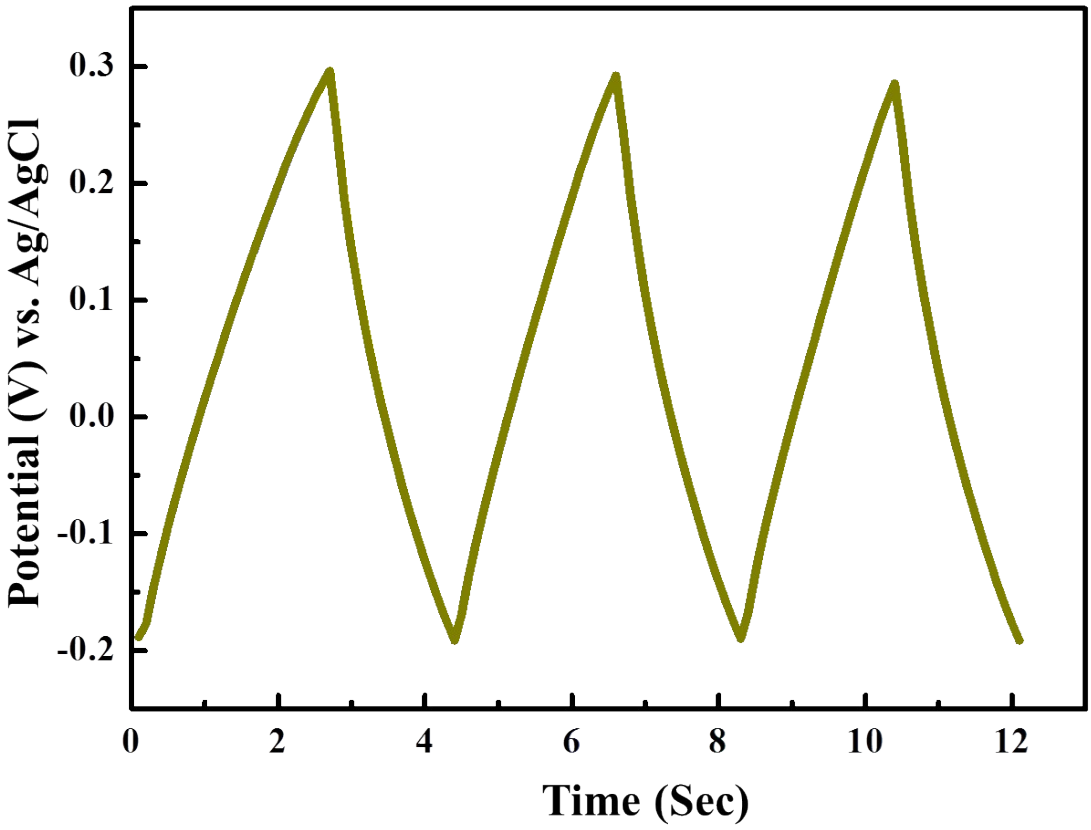

Fig. S3 Galvanostatic charge/discharge behavior of pure MnS (Expanded image of Fig. 11)