**Supporting Information**

**Flower-like MoS2 for Next Generation High Performance Energy Storage Device Applications**

Sumit Majumder\*and Sangam Banerjee

Surface Physics and Materials Science Division, Saha Institute of Nuclear Physics, 1/AF, Saltlake, Kolkata-700064, India.

\*Corresponding author’s email: sumitmajumder2779@gmail.com, Ph. No: (+91)8436836968



Figure S1. Room temperature PXRD patterns of sample S1 (3h), S2 (12h), S3 (24h), and S4 (40h).

**Table S1:** Comparison of electrochemical capacitance performance of the present supercapacitor with other reported supercapacitors.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Electrode Materials** | **Electrolyte** | **Specific Capacitance (Csp)** | **Current Density** | **References** |
| Spherical MoS2  | 1 M Na2SO4 | 92.85 Fg-1  | 0.5 mAcm-2 | **(**Krishnamoorthy et al, 2014) |
| MoS2 nanostructure | 1 M Na2SO4 | 122 Fg-1 | 0.5 Ag-1 | (Ilanchezhiyan et al., 2015) |
| 3D flower like MoS2 | 1 M KCl | 168 Fg-1 | 1 Ag-1 | (Wang et al., 2014) |
| MoS2 nanosheet  | 1 M Na2SO4 | 129.2 Fg-1 | 1 Ag-1 | (Huang et al., 2014) |
| MoS2 Nanowall film | 0.5M H2SO4 | 100 Fg-1 |  - | (Soon et al., 2007) |
| MoS2-Co3O4 composite | 1 M KOH | 69 Fg-1 | 0.5 Ag-1 | (Lianga et al., 2015) |
| MoS2-carbon composite  | 1 M Na2SO4 | 201.4 Fg-1 | 0.2 Ag-1 | Fan et al. 2015 |
| RuS2  | 0.5 M H2SO4 | 85 Fg-1 | 0.5 mAcm-2 | (Krishnamoorthy et al., 2017) |
| MnS/Graphene  | 6 M KOH | 156 Fg-1 | - | (Ramachandran et al., 2017) |
| MoS2/Mo | 1 M Na2SO4 | 192 Fg-1 | 1 mAcm-2 | (Krishnamoorthy et al. 2017) |
| MoS2/C | 3 M KOH | 210 Fg-1 | 1 Ag-1 | (Hu et al., 2013) |
| MoS2-Graphene |  | 243 Fg-1 | 1 Ag-1 | (Huang et al., 2013) |
| Flower-like MoS2 | 1 M Na2SO4 | 350 Fg-1210 Fg-1 | 0.25 Ag-1 1 Ag-1 | **[This Work]** |

**References:**

**Fan L, Liu G, Zhang C, Wu J, Wei Y** (2015) Facile one-step hydrothermal preparation of molybdenum disulfide/carbon composite for use in supercapacitor. *Int. J. Hydrogen Energy*, **40**, 10150–10157.

**Hu B, Qin X, Asiri A, Alamry K, Youbi A, Sun X** (2013) Synthesis of porous tubular C/MoS2 nanocomposites and their application as a novel electrode material for supercapacitors with excellent cycling stability *Electrochim. Acta* **100,** 24-28.

**Huang K, Wang L, Liu Y, Liu Y, Wang H, Gan T, Wang L** (2013) Layered MoS2egraphene composites for supercapacitor applications with enhanced capacitive performance. *Int. J. Hydrogen Energy* **38**, 14027-14034.

**Huang K, Zhang J, Shi G, Liu Y** (2014) Hydrothermal synthesis of molybdenum disulfide nanosheets assupercapacitors electrode material. Electrochim Acta, **132**, 397-403.

**Ilanchezhiyan P, Mohankumar G, Kang T** (2015) Electrochemical studies of spherically clustered MoS2 nanostructures for electrode applications. *J. Alloy. Comps*., **634**, 104-108.

**Krishnamoorty K, Kumar G, Veerasubramani G, Rhandhakrishnan S, Kim S** (2014) Supercapacitive properties of hydrothermally synthesized sphere like MoS2 nanostructures. *Mater. Res. Bull*., **50**, 499-502.

**Krishnamoorthy K, Pazhamalai P, Kim S** (2017) Ruthenium sulfide nanoparticles as a new pseudocapacitive material for supercapacitor *Electrochem. Acta*. **227**, 85-94.

**Krishnamoorthy K, Veerasubramani G, Pazhamalai P, Kim S** (2016) Designing two dimensional nanoarchitectured MoS2 sheets grown on Mo foil as a binder free electrode for supercapacitors. *Electrochem. Acta*. **190**, 305-312.

**Lianga D, Tiana Z, Liu J, Ye Y, Wu S, Cai Y, Liang C** (2015) MoS2 nanosheets decorated with ultrafine Co3O4 nanoparticles for high-performance electrochemical capacitors Electrochim. Acta **182**, 376–382.

**Ramachandran R, Saranya M, Grace A, Wang F** (2017) MnS nanocomposites based on doped graphene: simple synthesis by a wet chemical route and improved electrochemical properties as an electrode material for supercapacitors*. RSC Adv*. **7**, 2249-2257.

**Soon J, Loh K** (2007) Electrochemical Double-Layer Capacitance of MoS2 Nanowall Films. Electrochem. Solid-State Lett., **10**(11), A250-A254.

**Wang X, Ding J, Yao S, Wu X, Feng Q, Wang Z, Geng B** (2014) High Supercapacitor and Adsorption Behaviors of Flower-like MoS2 nanostructures. J. Mater. Chem. A **2**, 15958-15963