**Table S7**. SBM Parameters obtained from the curve fit for fixed Q=6 and remaining SBM parameters allowed to float.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Definition** | **Oxidized Graphite** | **Graphene Nanoplatelets** | **Reduced Graphene Nanoplatelets** | **Graphene Nanoribbons** |
|  | Zero-field splitting energy (ZFS) | 3.55x1018 | 1.0x1018 | 1.03x1018 | 1.0x1018 |
|  | Manganese-Hydrogen Bond Radius | 3.61x10-10 | 3.36x10-10 | 3.73x10-10 | 2.92x10-10 |
|  | Hydration number | 6 | 6 | 6 | 6 |
|  | Tumbling time of complex | 2.03x10-9 | 1.46x10-9 | 2.82x10-9 | 5.16x10-9 |
|  | Correlation time for splitting | 1.0x10-12 | 1.0x10-12 | 1.0x10-12 | 1.0x10-12 |
|  | Residence time of inner sphere water molecules | 7.81x10-8 | 1.0x10-6 | 1.76x10-8 | 1.88x10-9 |