**Mechanical, Tribological, and Electrochemical Behavior of Hybrid Aluminum Matrix Composite Containing Boron Carbide (B4C) and Graphene Nanoplatelets (GNPs)**

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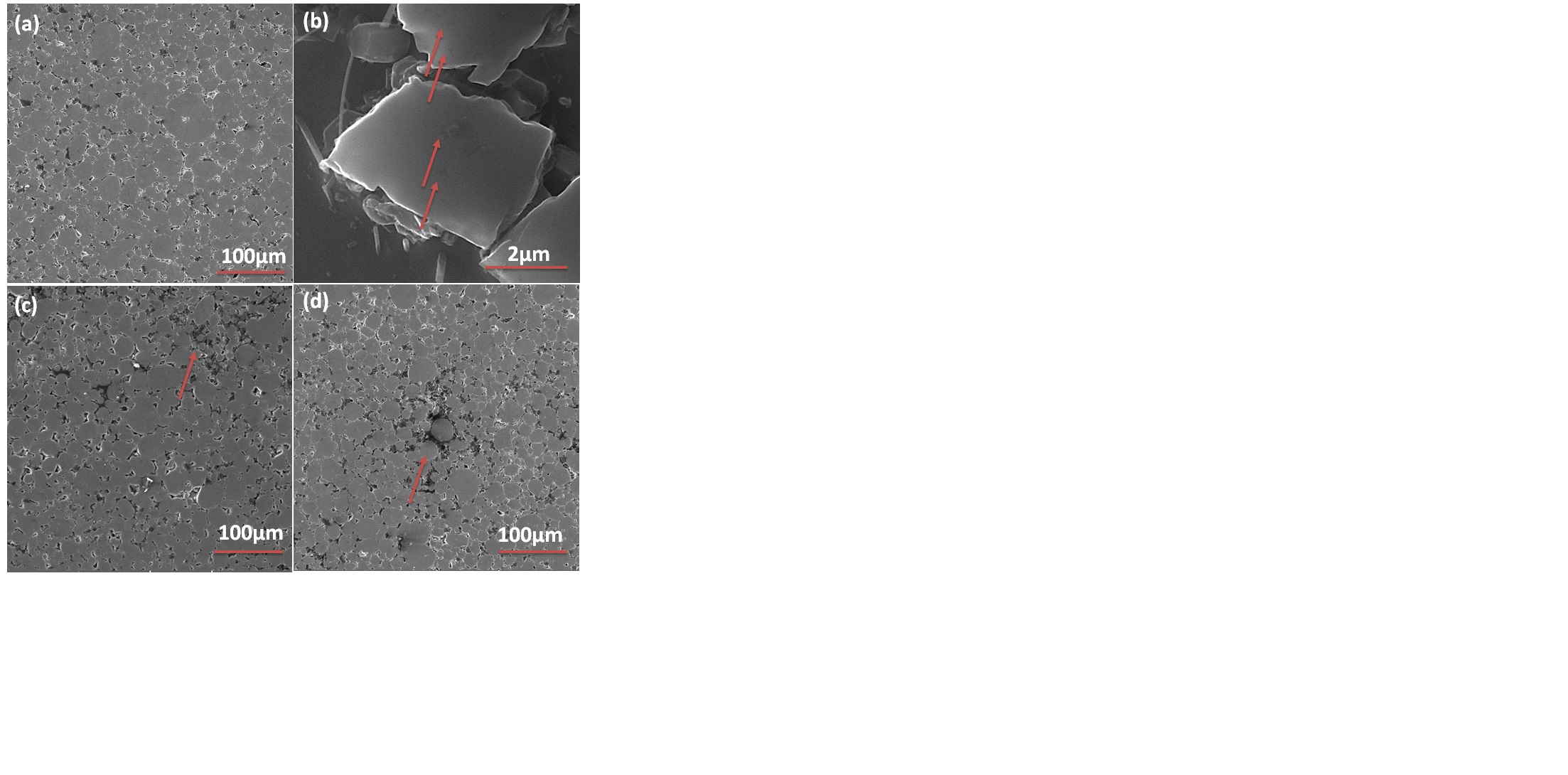
**FIG. S1: Raman Spectra of (a) graphite, (b) graphene oxide, and (c) graphene; (d) XRD pattern of synthesized graphene**

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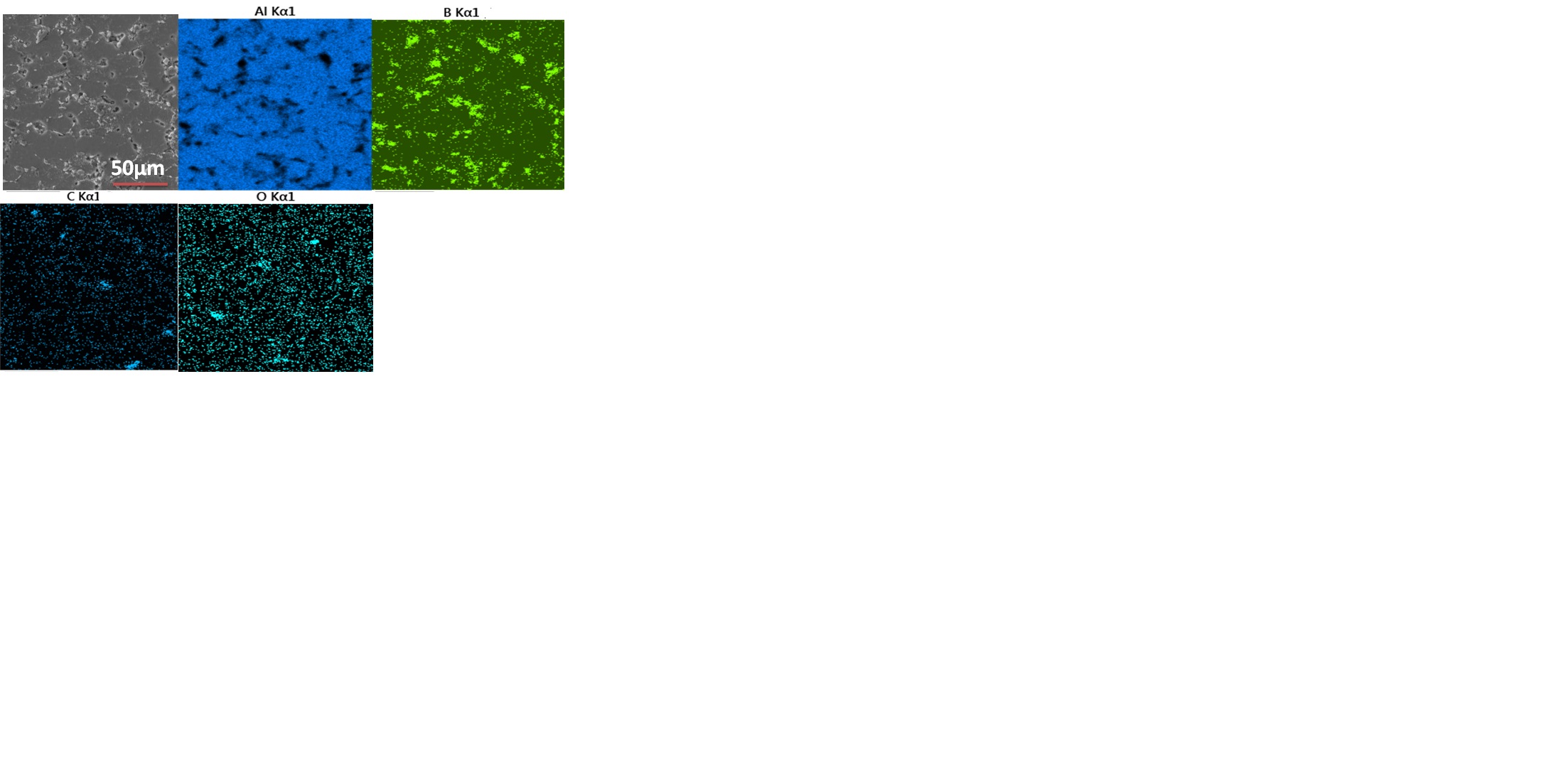
**FIG. S2: SEMs micrographs of synthesized Graphene nanoplatelets**

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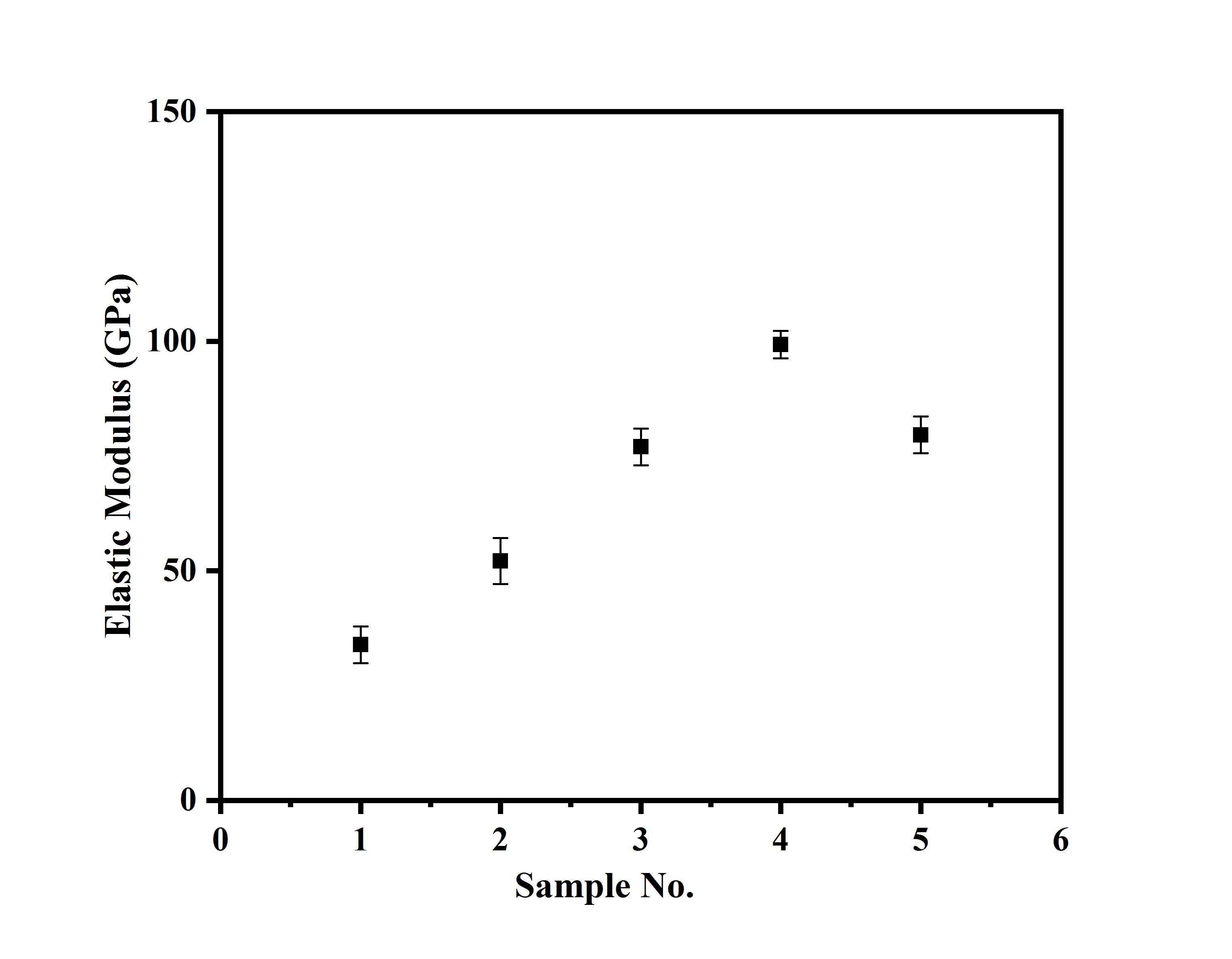
**FIG. S3: SEM images of Al/B4C/GNPs composite powders after wet mixing and ball milling**

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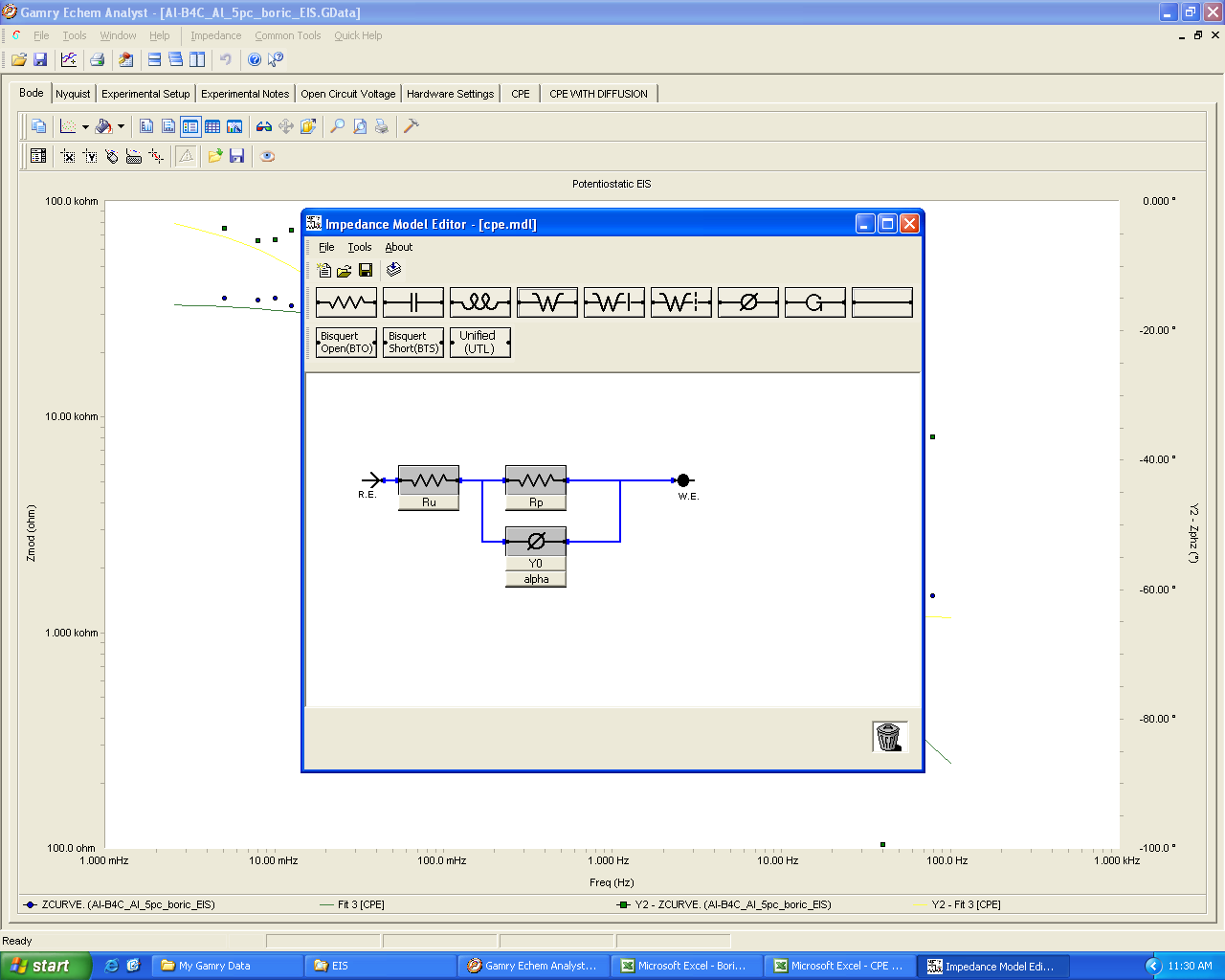
**FIG. S4: SEM images of sintered (a,b) Al/10 wt. % B4C/ 0.6 wt.% GNPs, (c,d) Al/10 wt. % B4C/ 1.2 wt.% GNPs**



**FIG. S5: EDS mapping of sintered Al/10 wt. % B4C/ 0.6 wt.% GNPs composite**

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**FIG. S6: Elastic moduli of Al/B4C/GNPs composites**



**FIG. S7: Equivalent electronic circuit model for EIS data fitting.**

**Table SI. Theoretical and experimental densities of pure aluminium and aluminium matrix composites containing boron carbide and GNPs.**

|  |  |  |
| --- | --- | --- |
| **Samples** | **Theoretical Density (g/cm3)** | **Experimental Density (g/cm3)** |
| 1 | 2.7 | 2.64±0.3 |
| 2 | 2.68 | 2.62±0.2 |
| 3 | 2.67 | 2.61±0.4 |
| 4 | 2.67 | 2.61±0.3 |
| 5 | 2.66 | 2.59±0.4 |