

Multifunctional Polymer Dispersant for Graphene/AgNWs Nanocomposites

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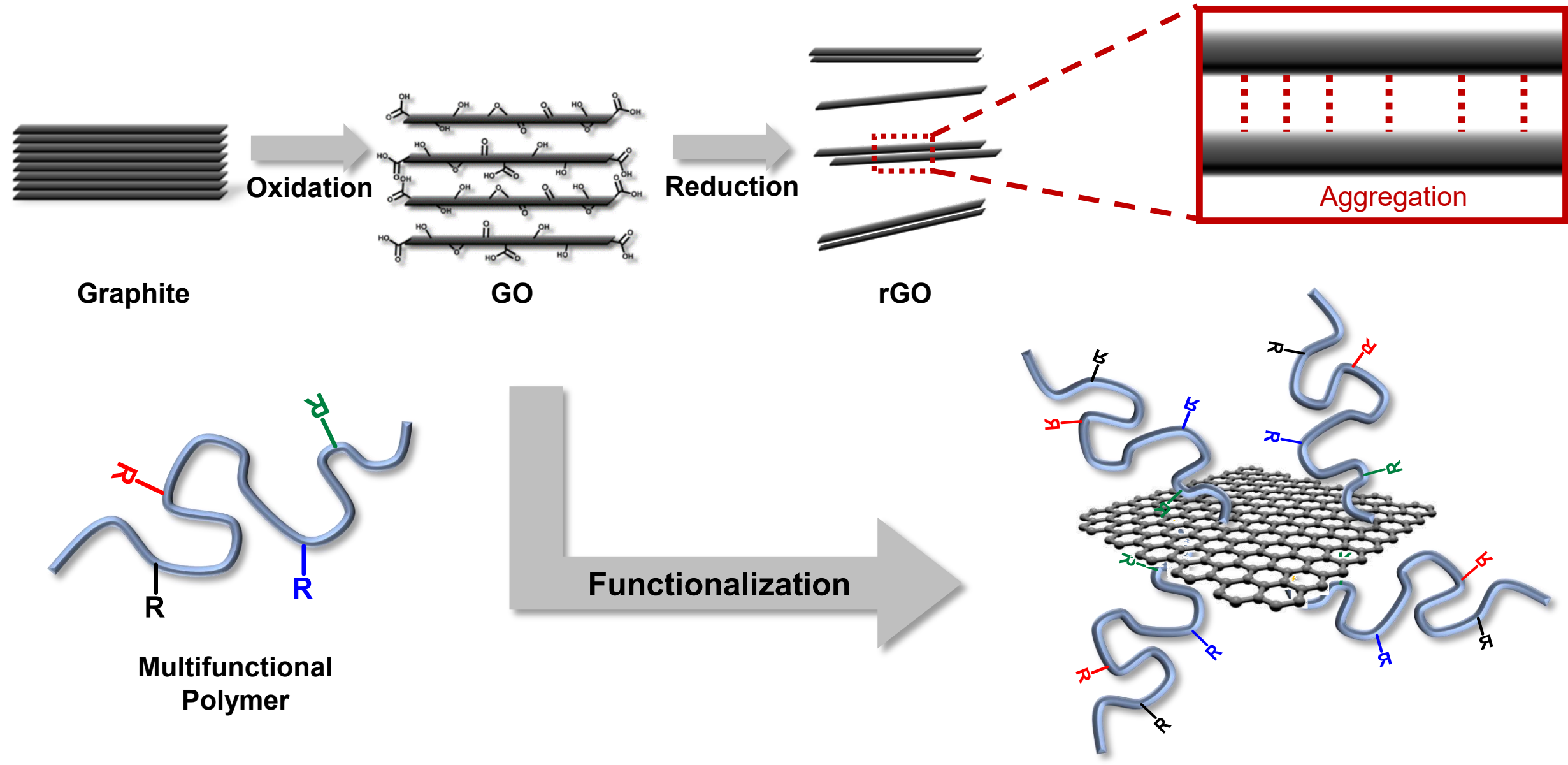


Abstract

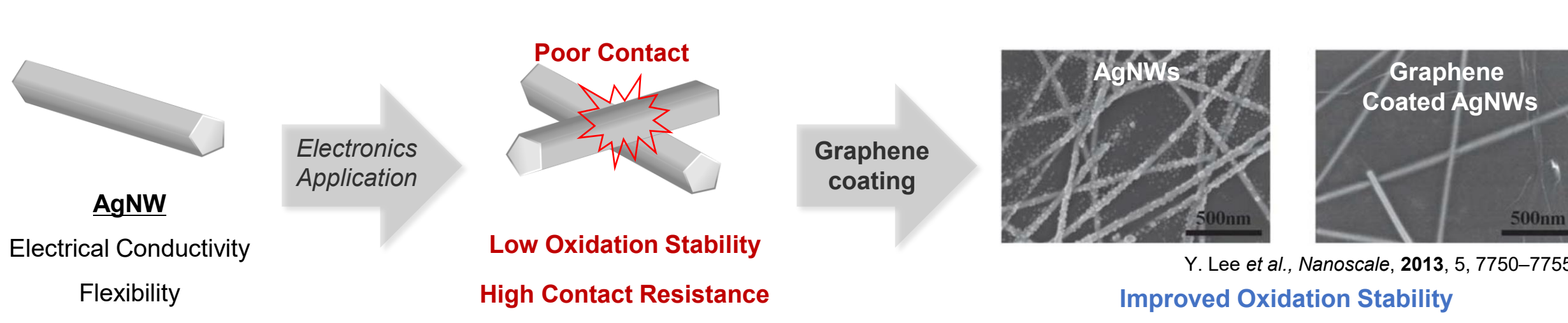
We developed a multifunctional polymer dispersant incorporating styrene sulfonate, disulfide-based methacrylate, and potential urethane-forming protected isocyanate groups. The newly developed dispersant facilitated the stable aqueous co-dispersion of graphene and AgNWs while improving the oxidation resistance and conductivity. Structural analysis by NMR and IR confirmed the successful synthesis of the polymer, while TEM imaging revealed graphene-coated AgNWs for enhanced oxidation resistance and improved electrical performance. This novel nanocomposite exhibits significant potential for advanced electrodes and sensors, overcoming the challenges in graphene/AgNW systems. The proposed approach paves the way for the development of stable, high-performance materials for next-generation electronic devices.

Introduction

Chemical exfoliation of graphite

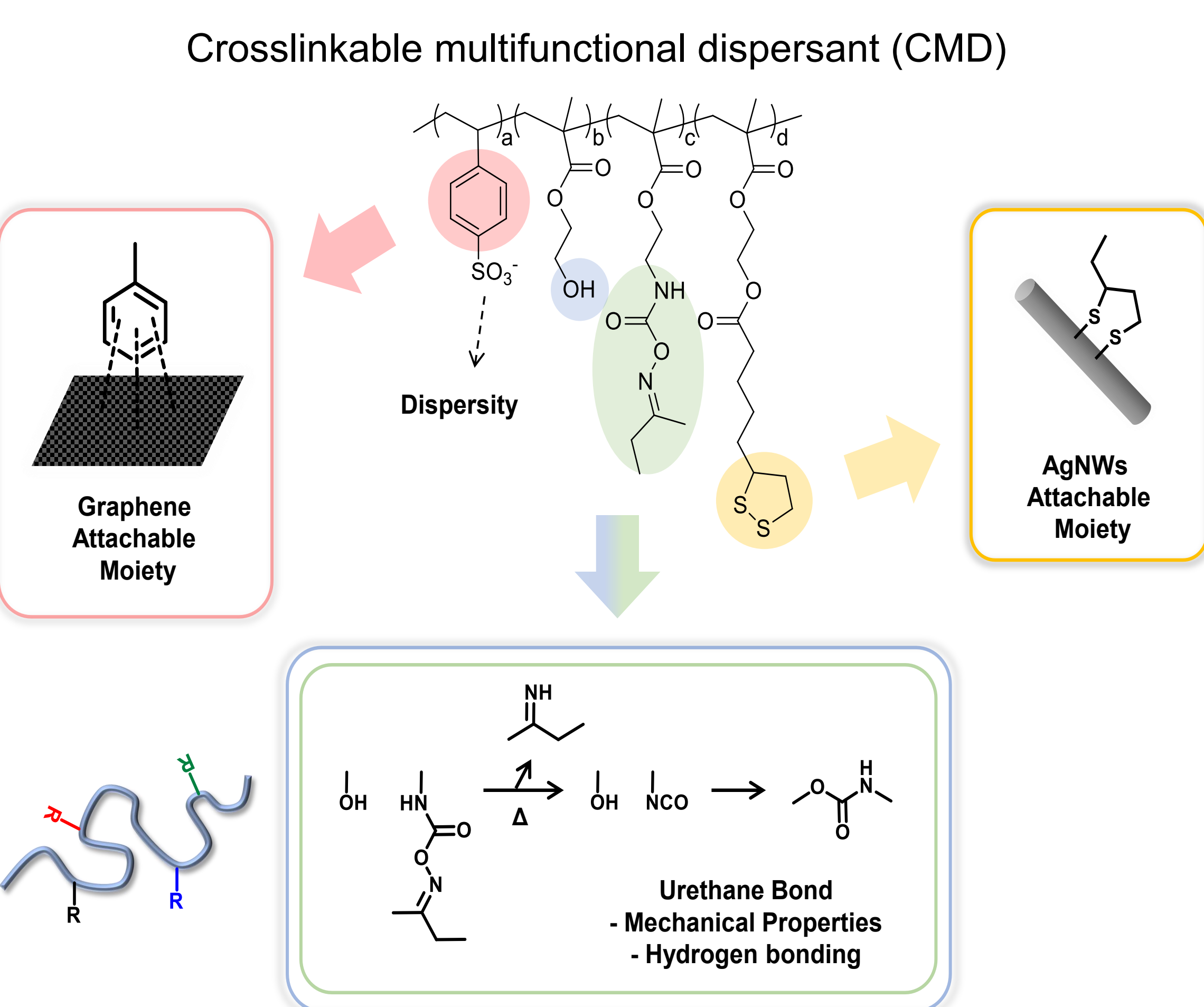


Graphene/AgNWs hybrid nanocomposites



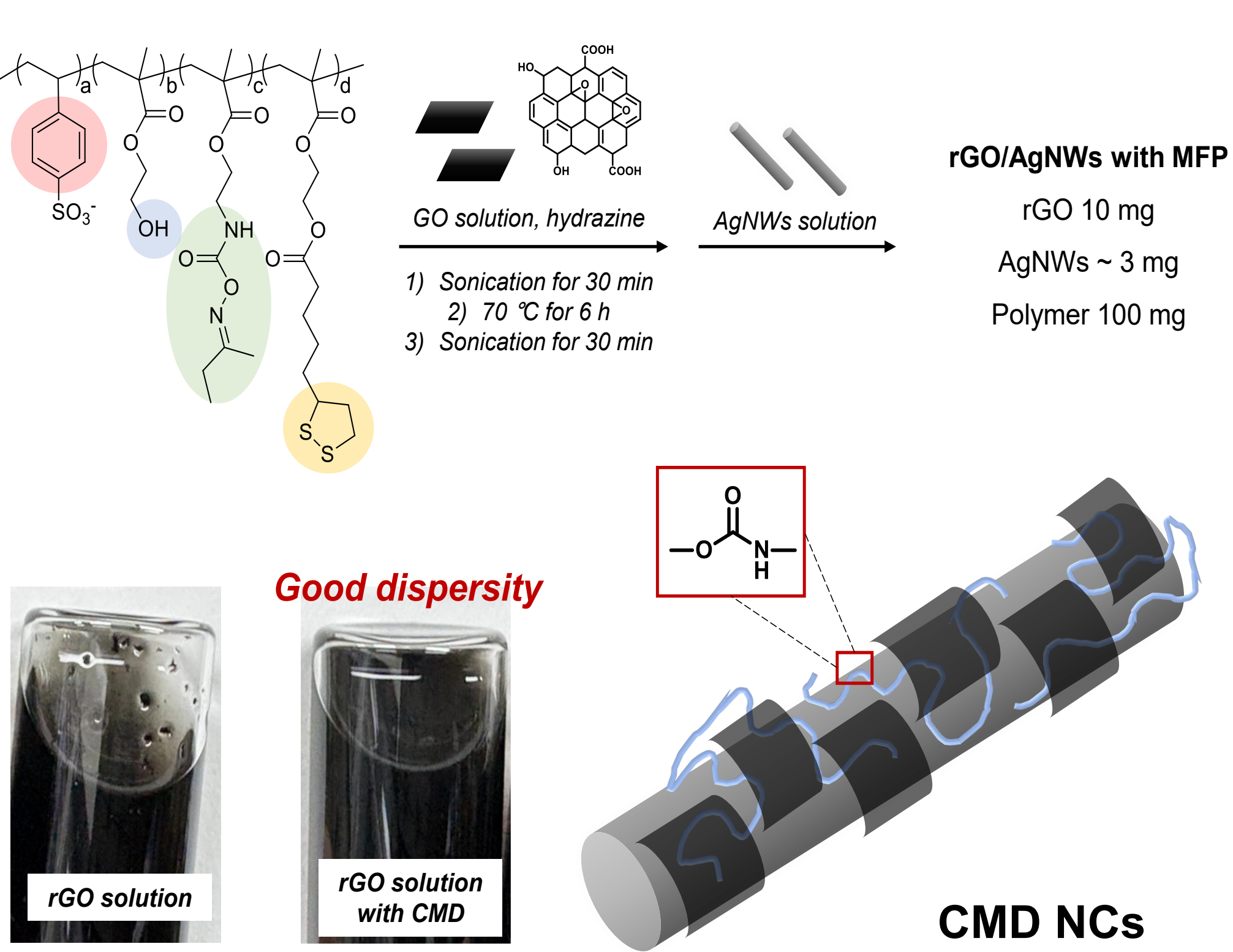
Research Goal

Enhanced stability of rGO/AgNW nanocomposites

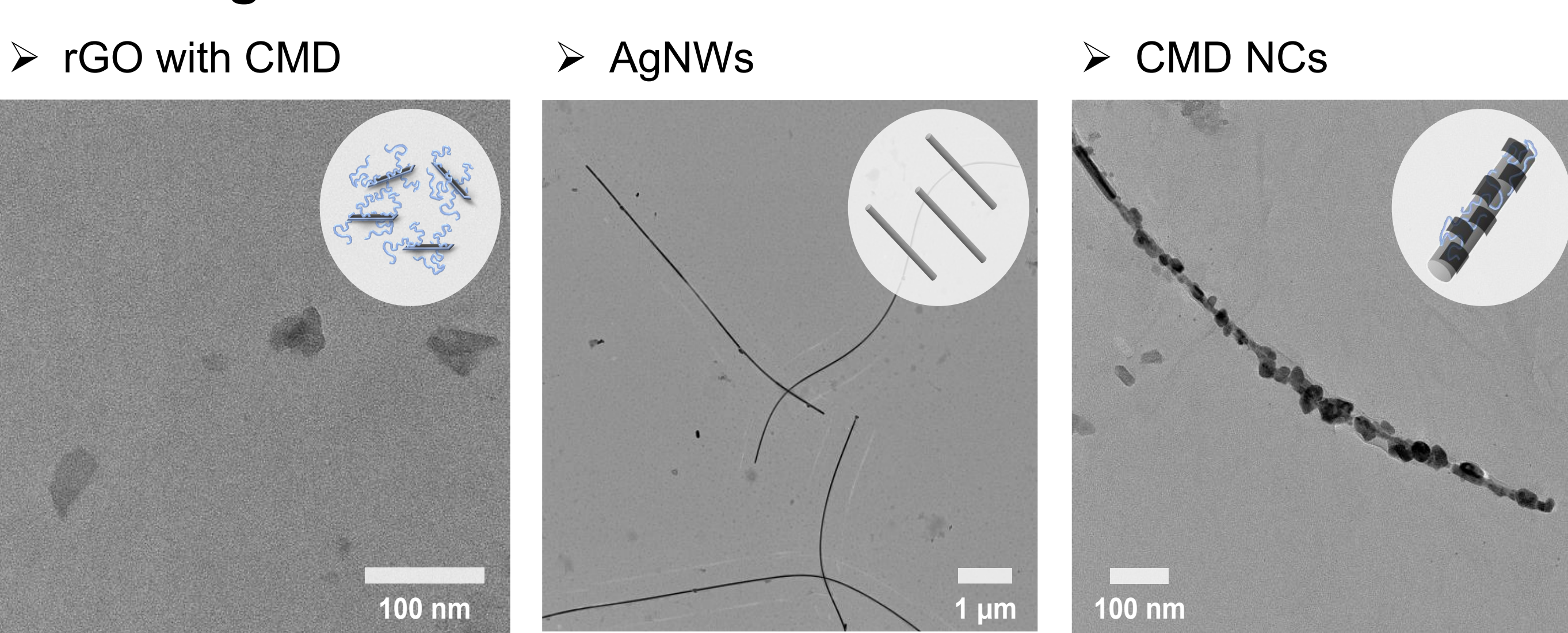


Result & Discussion

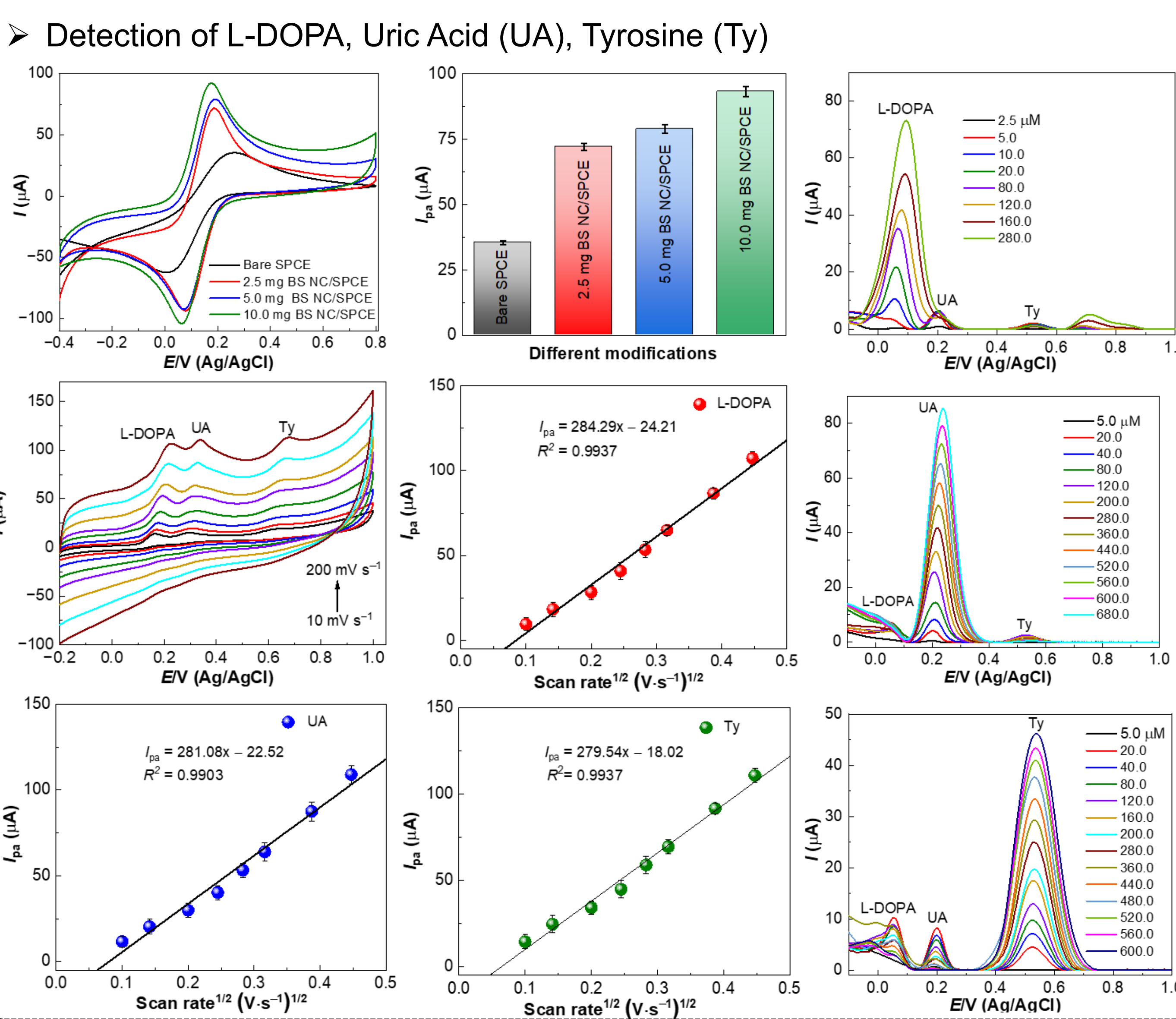
Preparation of CMD nanocomposites



TEM images of CMD NCs



Sensor applications for Parkinson's disease diagnosis



Conclusions

- ✓ We synthesized a crosslinkable multifunctional dispersant, and designed graphene-attached AgNWs nanocomposites.
- ✓ Under heating, the blocked isocyanate undergoes a deblocking reaction, leading to urethane-based crosslinking.
- ✓ The CMD NCs was applied as a sensor for Parkinson's disease, enabling effective detection of L-DOPA, UA, and Ty.

Acknowledgement

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