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**Energy Storage: Nanostructured Manganese Dioxide for Supercapacitor Application**

1. **Introduction**
   Supercapacitors are energy storage devices that use carbon, conductive polymers and transition metal oxides such as MnO₂ as electrode material. They are different from traditional capacitors due to their storage mechanism and the ability to store much more energy.

2. **Goal**
   To improve the specific capacitance of manganese dioxide by maximizing the surface area of the electrode.

3. **Methodology**
   Tri-block copolymer, P123, used as soft template
   - P123 dissolves in water and form micelles
   - Add Mn²⁺ ions which surround the micelles
   - Mn²⁺ oxidizes to MnO₂ by KMnO₄
   - MnO₂ precipitated
   - Remove P123 by washing with water
   - Mesoporous MnO₂ obtained

4. **Results**
   - SEM shows hierarchical nano-rod morphology
   - XRD shows α-MnO₂ phase
   - CV curves at various scan speed close to rectangular shape, shows relatively ideal pseudo-capacitive behavior

5. **Conclusion**
   We have synthesized mesoporous α-MnO₂ using P123 and achieved a maximum specific capacitance of 355F/g. More work will be done to optimize the performance of our electrode material.