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Ultralow Content Silver Densely-Coated Glass Microsphere for High Performance Conducting Polymer-Matrix Composites

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Abstract: A synergistic electroless Ag plating using binary reductants of NaBH₄ and glucose is demonstrated to fabricate high conducting silver-coated glass microsphere composite particles (GM@AgCPs) with ultralow Ag content (W_{Ag}) of 5.1 wt% for high performance conducting polymer-matrix composites (CPMCs). In this approach, NaBH₄, as strong reductant, plays an important role in the nucleation while glucose, as weak one, is responsible for the growth of nuclei, indicating the synergistic effect between the binary reductants. Furthermore, the nucleation and growth are dexterously separated by our experimental design. First, the addition of a small amount of NaBH₄ solution results in a large driving force of redox reaction, and favors nucleation burst. Meanwhile, homogeneous nucleation is effectively inhibited at a low T . Second, glucose at an

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