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**A transparent pressure-sensitive adhesive with high electrical conductivity based
on water-soluble nano core-shell hollow composite**

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Abstract

The transparent conductive pressure sensitive adhesives (PSAs) are increasingly used for demanding applications, such as interconnects in electronic assemblies and transparent conductive films. Graphene is an efficient modifier for highly conductive PSAs, but it is hard to prepare homogenous composite and the transparency of PSA is bad, moreover, there is increased contact resistance during elevated temperature and humidity. In this work, we report a water-soluble core-shell hollow composite using graphene oxide (GO) modified by acrylamide as core through in situ polymerization. The composite is homogenous without any aggregation after testing in normal temperature for 100 days. The light transmittance of the PSA based on polyethylene terephthalate film is above 90% if the content of GO in the composite is under 0.2 wt%. The electrical conductivity of the PSA increases from 0.29 Sm⁻¹ to 0.62 Sm⁻¹ while the related humidity ranges from 0% to 90%. PSA film formed by core-shell composite can hold hydrone and exhibit advanced electrical conductivity in high humidity atmosphere. The conductivity of the composite is stable and unchanged in high temperature.

Keywords: core-shell composite; graphene oxide; conductive; transparent

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