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Transparent and flexible high frequency transmission lines based on composite structure comprising silver nanowires and polyvinyl butyral

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Abstract

Percolated networks of silver nanowires (AgNWs) have attracted intensive attention because of their remarkable mechanical stability, along with their excellent optical and electrical performance for the fabrication of flexible transparent electrodes. Most prior research has mainly focused on fabricating transparent electrodes that can be used in optoelectronic devices such as touch sensors, light emitting diodes, and photovoltaics. However, fabrication of transparent and flexible transmission lines designed to conduct alternating current of high frequency has not been reported so far. Herein, we developed highly transparent, mechanically stable transmission line by employing inverted layer processing (ILP) in order to embed the AgNWs just below the surface of a free-standing transparent polymer. For this, we synthesized polyvinyl butyral (PVB), which can be prepared from polyvinyl alcohol by reaction with butyraldehyde, for AgNW support.

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