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Fluoropolymer based composite with Ag particles as 3D printable conductive ink for stretchable electronics AMIT KUMAR, THANH GIANG LA, XINDA LI, HYUN JOONG CHUNG, Univ of Alberta — The recent development of stretchable electronics expands the scope of wearable and healthcare applications. This creates a high demand in stretchy conductor that can maintain conductivity at high strain conditions. Here, we describe a simple fabrication pathway to achieve stretchable, 3D-printable and low-cost conductive composite ink. The ink is used to print complex stretchable patterns with high conductivity. The elastic ink is composed of silver(Ag) flakes, fluorine rubber, an organic solvent and surfactant. The surfactant plays multiple roles in in the composite. The surfactant promotes compatibility between silver flakes and fluorine rubber; at the same time, it affects the mechanical properties of the hosting fluoropolymers and adhesion properties of the composite. Based on experimental observations, we discuss the exact role of the surfactant in the composite. The resulting composite exhibits high conductivity value of 8.49 *10 ^{4} S/m along with high reliability against repeated stretching/releasing cycles. Interesting examples of transfer printing of the printed ink and its applications in working devices, such as RFID tag and antennas, are also showcased.

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