

## On the Reliability of Highly Stretchable Electronic Interconnects

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### Abstract

Specially developed silver based inks can be screen printed onto TPU, offering inexpensive manufacturing of flexible electronics substrates that can be stretched to more than 10 times their initial length without loss of conductivity. Such stretchability is of potential interest for a broad range of applications of flexible and flexible hybrid electronics. We present results from an ongoing systematic characterization of the performance and reliability of the traces.

Varying with the choice of ink the traces are not necessarily superior to alternative inkjet printed or aerosol printed ones if much more moderate levels of stretching are sufficient. Their resistances do, for example, increase much more rapidly, the resistance of one type doubling when stretched by only 2% although that one recovers completely upon unloading. Even that one is, however, damaged in repeated stretching to such levels. Comparisons between inks and to alternatives are complicated by different sensitivities to strain rates, amplitude, and holds before relaxation. Annealing and even more so exposure to humidity both tend to reduce the resistance, but this does not necessarily mean that resistance to cycling is improved, i.e. long term degradation remains a focus of ongoing studies.