Flexible and transparent, graphene-based capacitive touch sensing

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Abstract

The future of wearable and flexible technologies relies on the successful integration of suitable materials. We show that graphene produced by cold-wall CVD is suited to a new generation of flexible electronics owing to its unique properties and compatibility with contemporary industrial practices [1].
Using a novel fabrication method to pattern graphene electrodes while still on the copper growth substrate, we preserve the high quality of the graphene and present a transparent and flexible capacitive touch sensor, shown in Figure 1(a). The device consists of two sets of parallel graphene electrodes separated by a thin polymer dielectric. Upon applying a load to the intersection of two strips, the polymer is compressed and an increase in capacitance is observed as shown in Figure 1(b). The device also shows a fast response time with periodic loading and unloading as shown in Figure 1(c) as well as good durability by maintaining a consistent line resistance after several flexing cycles, shown in Figure 1(d). We expect this work to aid the development of sensing in artificial skins for medical and robotic applications.

References

[1] Thomas H. Bointon, Matthew D. Barnes, Saverio Russo, Monica F. Craciun, Advanced Materials, **28** (2015) 4200-4206

Figures

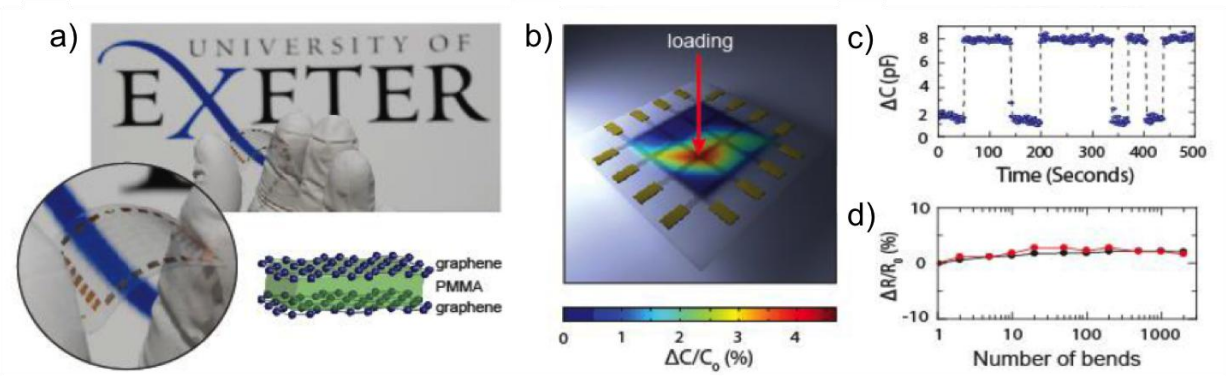

Figure 1. a) Shows a photograph and schematic of a flexible and transparent graphene touch sensor with a schematic of the device. b) Colourmap showing the change in capacitance measured upon loading a single element of the device. c) Change in capacitance with time of the device when pressed. d) Change in line resistance after flexing the device 1000 times.