Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Graphene Elastomer composite

Sensitive, high-strain, high-rate, bodily motion sensors base on graphene rubber composites

Overview

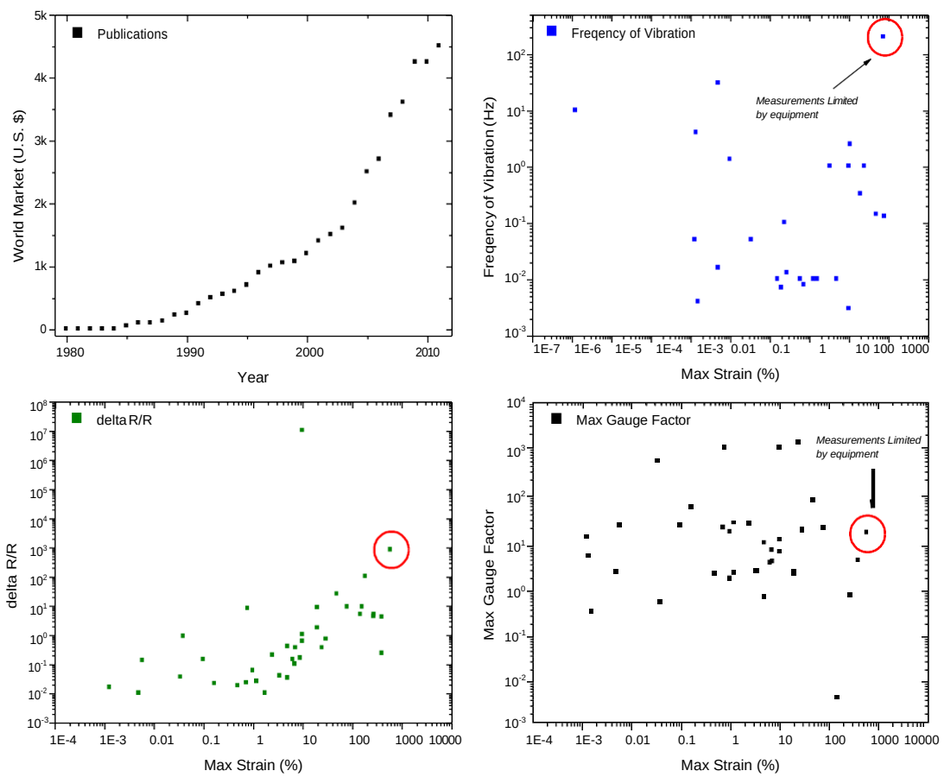
In this work, we demonstrate a very simple method of infusing store-bought elastic bands with liquid-exfoliated graphene to produce a versatile strain sensor. With unprecedented electrical and mechanical capabilities, these sensors demonstrate a substantial improvement in performance over comparable sensors.

Advantages

Monitoring of human bodily motion requires wearable sensors that can detect position, velocity and acceleration. They should be cheap, lightweight, mechanically compliant and display reasonable sensitivity at high strains and strain rates. No reported material has simultaneously demonstrated all the above requirements.

Researchers at Trinity College Dublin have demonstrated a very simple method of infusing store-bought elastic bands with liquid-exfoliated graphene to produce a versatile strain sensor. With unprecedented electrical and mechanical capabilities, these sensors demonstrate a substantial improvement in performance over comparable sensors. The graphene-infused rubber bands are excellent strain sensors, displaying 104-fold increases in resistance and working at strains exceeding 800%. The sensitivity is reasonably high, with gauge factors of up to 35 observed. More importantly, these sensors can effectively track dynamic strain, working well at vibration frequencies of at least 160 Hz.

Trinty College's work circled in red



Applications

- Respiratory rate monitor
- Heart rate monitor
- Speech generator
- Animation
- Plastic electronics
- ‘Smart’ clothes
- Personal health and well-being devices
- Statistical athletic training
- Physiological rehabilitation

Technology Status

This technology is currently in a prototype product development testing stage. A patent has been filed on this technology and methodology by Trinity College (TCD Ref: JC01-452- 01).

Market Opportunity

The past decade has seen a growing body of research devoted to the integration of electronics with biological or other soft, stretchable, flexible systems. Such strain and motion sensors usually work by sensing the change in resistance of a material in response to variations in its length. This field is broad, ranging from wearable bio-sensors to ultra-light, foldable plastic electronics. This technology meets all the needs of industry surpassing any other known sensor on the market.

Technology Sector
Processing Technology and Novel Materials

Patent Details
Granted US Patent: US10251604B2
Granted EPO: EP3052553B1

Opportunity
Research collaboration
Available to License

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JC01-452-01

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science foundation ireland
fondúireacht eolaíochta éireann

Ireland’s EU Structural Funds Programmes 2007 - 2013
Co-funded by the Irish Government and the European Union

EUROPEAN REGIONAL DEVELOPMENT FUND