

# Defect Engineering in Graphene using Ion Irradiation

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The properties of 2D materials are sensitive to structural defects [1, 2]. Controlling the nature and concentration of defects therefore provides a means of tailoring material properties for specific applications. Ion irradiation is a well-established technique that provides a practical means of defect engineering, so there is particular value in understanding how the structure and concentration of defects depend on ion-irradiation parameters.

This study examines the effect of several important aspects of ion-induced radiation damage in graphene, namely: the effect of the ion fluence and nuclear stopping power ( $S_n$ ) of incident ions on the concentration and structure of defects; the role of the substrate in damage production; and the significance of collective effects associated with molecular ion irradiation.

- [1]. Rajasekaran, G., P. Narayanan and A. Parashar, *Effect of Point and Line Defects on Mechanical and Thermal Properties of Graphene: A Review*. Critical Reviews in Solid State and Materials Sciences, **41**(1): p. 47-71 (2016).
- [2]. Lopez-Polin, G., et al., *Increasing the elastic modulus of graphene by controlled defect creation*. Nature Physics, **11**(1): p. 26-31 (2015).