Graphene Odyssey 2: Graphene Production via Resonant Frequency Exfoliation

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Graphene is a multipurpose nano particle that is difficult and expensive to produce. This project focuses on a safer, more efficient and cost effective method of producing graphene using natural resonance frequency exfoliation. All substances and structures have a Natural Resonant Frequency (NRF), which can be determined by measuring the inductance and capacitance of an object using an electrical multimeter. The NRF of graphite and copper (for comparison) electrodes were determined, the electrodes were suspended in differing solutions, then subjected to a frequency generator at the calculated frequency to oscillate the electrode. The result was the exfoliation of micro and nano particles into the solutions. Optical microscopy; Laser refraction/diffraction; Electrical conductivity; pH and Spectrum analysis were conducted to compare the solutions to the controls of commercially sourced graphene in solution and dried on silica plates. All frequencies produced evidence of varying amounts of graphene and copper nano particles. The NRF, both in high and low harmonics yielded greater particle counts as well as absorbance, reflectance, refraction and conductivity that were consistent with commercially obtained graphene. All solutions proved beneficial as a molecular wedge media for graphene and nano particle production, but the vinegar and alcohol produced the most particulates in the control graphene range. The Resonant Frequency Exfoliation method proves to be a low cost, efficient, safe alternative to current graphene production methods.

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