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Growth of thin carbon-based films by laser assisted methods

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C60 fullerene thin films of average thickness of more than 100 nm can be produced in vacuum by matrix-assisted pulsed laser evaporation (MAPLE). In MAPLE, a guest molecule, e.g., a polymer or a bioorganic molecule, usually in a concentration lower than 2 wt%, is dissolved and subsequently frozen into a light absorbing matrix. When this matrix is irradiated by the laser light, the solvent evaporates and the guest material, e.g., the polymer or the bioorganic molecules are subsequently collected on a substrate.
In this study, a 355 nm Nd:YAG laser was directed onto a frozen target of anisole with a concentration of 0.67 wt% C60. At laser fluences below 1.5 J/cm2, a dominant fraction of the film molecules are C60 transferred to the substrate without any fragmentation. MAPLE favours evaporation of matrix with organic molecules, which may result in production of films with controlled average thickness, minimal contamination and possibly smooth surfaces.
Using MAPLE, single wall nanotubes (SWN) in combination with polymers composite films can be produced as well. These films can be deposited on a variety of substrates, e.g., Si, glass, plastic, and metal, using the same target and deposition conditions. Using an electric field, aligned carbon nanotube films are expected to be fabricated."

Micro Four-Point Probe Measurements of Graphene on Silicon Carbide

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Four-point probe measurements are the classic method for investigating conductivity independent of contact resistances. By implementing this technique at the micron scale, in ultra-high vacuum, clean, local measurement of the conductivity is possible. By varying the effective separation of the contact probes, discrimination between conduction through the bulk and the surface can be achieved. Data from both monolayer graphene on silicon carbide and hydrogen-intercalated quasi-freestanding graphene will be presented. The transport is shown to be two-dimensional in character, and the measured conductivity is combined with photoemission data to extract the mobility."