

Novel carbon coatings for optical and electronic applications

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Advances in deposition techniques enable carbon thin films to be deposited with a range of different bonding configurations and microstructure. These new types of carbon coatings exhibit interesting properties, opening the way to create novel thin film coatings with unique electrical, thermal, mechanical and optical characteristics. Here we investigate the synthesis of novel carbon based coatings for advanced optical applications. Carbon from a 99% pure carbon cathode was deposited using a filtered cathodic vacuum arc system onto copper and nickel substrates. By varying the landing energies of the carbon ion species and temperature of the substrate the microstructure of carbon coatings can be varied. We have discovered deposition conditions which give rise to a novel highly porous graphitic microstructure suitable for use as an anti-reflective coating. In this work, the relationship between the optical properties and microstructure of this novel coating material has been investigated using electron microscopy.