Microwave plasma-induced growth of vertical graphene from fullerene soot

ABSTRACT

Vertical graphene (VG) films can be fabricated on the surface of nickel foil from fullerene soot (FS) under microwave plasma irradiation (MPI) in a mixture gas of H2 and Ar at 1200 W for 15 min. The resulting FS-derived VG films mostly consist of few-layer graphene sheets with large domain graphene sizes, high graphitization order, and high purity, as characterized by scanning and transmission electron microscopies, Raman spectroscopy, and X-ray photoelectron spectroscopy. Combined the present and previous results, MPI technique is an effective and versatile approach to synthesize vertically oriented graphene sheets from any carbon-containing sources.