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**Surface Analysis of $sp^2$ Carbon in Ag and Al Covetic Alloys*** H M IFTEKHAR JAIM, Materials Science and Engineering Department, University of Maryland, College Park, MD 20742, USA, DANIEL P. COLE, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD 21005, LOURDES G. SALAMANCA-RIBA, Materials Science and Engineering Department, University of Maryland, College Park, MD 20742, USA — Ag, Al-6061 and Al-7075 were doped with carbon by an electrocharging assisted process where high electric current is applied to the molten metal containing particles of activated carbon. This process gives rise to epitaxial growth of graphene nanoribbons (GNR) and carbon nanostructures within the metal matrix. Alloys produced with such technique are named Covetics. Al-6061 and Al-7075 covetics have shown superior mechanical, electrical and anti-corrosion properties. The nanostructured carbon incorporation has been confirmed by XPS, Raman, and TEM studies. Here, we present detailed surface characterization of the carbon nanostructures in these new alloys. Raman and EELS mapping of carbon nanostructure were carried out to identify the nature of bonding, strain and defect characteristics. Mostly, crystalline GNR or graphene sheets were found to create networks with sp2 character, under compressive strain with high concentration of defects. AFM and KPFM showed contrast in phases and potentials for ribbon like features. Incorporation of sp2 carbon in metals is an initial step for the integration of carbon nanostructures for future applications requiring high strength and conductivity.

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