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Reversible plasma-based functionalization of advanced carbon materials EVA KOVACEVIC, JOHANNES BERNDT, GREMI, University of Orleans, THOMAS STRUNSKUS, Christian-Albrechts-University of Kiel, Germany, NICOLAS CAMARA, GREMAN, Tours, France, CHRISTOPHE CACHONCINLLE, MIREILLE GAILLARD, CHANTAL BOULMER-LEBORGNE, GREMI, University of Orleans, France — Advanced carbon materials, such as graphene, carbon nanotubes or nanoparticles possess unique chemical and physical properties that make them interesting for wide area of applications, ranging from their use in electronics, as fillers for novel composite materials or as base for the development of new chemical sensors and catalysts. The key challenge to be overcome for actual applications is the simple and stable tuning of the surface properties of these materials. This contribution deals with the capacitively coupled discharges that are a versatile tool for the synthesis of such materials and at the same time also suitable for their surface modifications. We focus here on our results concerning the production and controlled and reversible covalent functionalization of advanced carbon materials. The quality of the deposits and the effect of the plasma treatments are analyzed by means of transmission electron microscopy, near edge X-ray absorption fine structure spectroscopy (NEXAFS), high resolution X-ray Photoelectron Spectroscopy (XPS), and contact angle measurements. Special attention is paid to the reversibility of the plasma induced functionalization by use of plasma based EUV photon irradiation.

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