Mass spectrometry and surface adsorption measurements in a nanoparticle forming Ar/ethanol RF plasma

E. von Wahl[1], T. Lecas[1], M. Mikikian[1]

[1] *GREMI, UMR7344, CNRS/Université d'Orléans, Orléans, France*
mél: erik.von-wahl@univ-orleans.fr

Whereas nanoparticle formation is well studied for some hydrocarbon precursors like methane, acetylene or ethylene, unconventional precursors like ethanol are far less investigated. Here, the kinetics of the nanoparticle forming chemistry in a low pressure RF discharge of an argon ethanol mixture are analysed by means of mass spectrometry. Meantime, the film growth rate is measured with a quartz crystal microbalance (QCM). As it turns out, the adsorption of ethanol on dirty surfaces, e.g. thin film material, could potentially play an important role in the process. Hence, the QCM is also utilised to specify the amount of adsorbed ethanol on the reactor surfaces prior to plasma ignition. Key species formed in the plasma are revealed, that render nanoparticle formation likely and other species supressing the necessary formation of big molecules are also identified. Furthermore, the time evolution of chosen masses is tracked during the growth of nanoparticles (see figure 1).

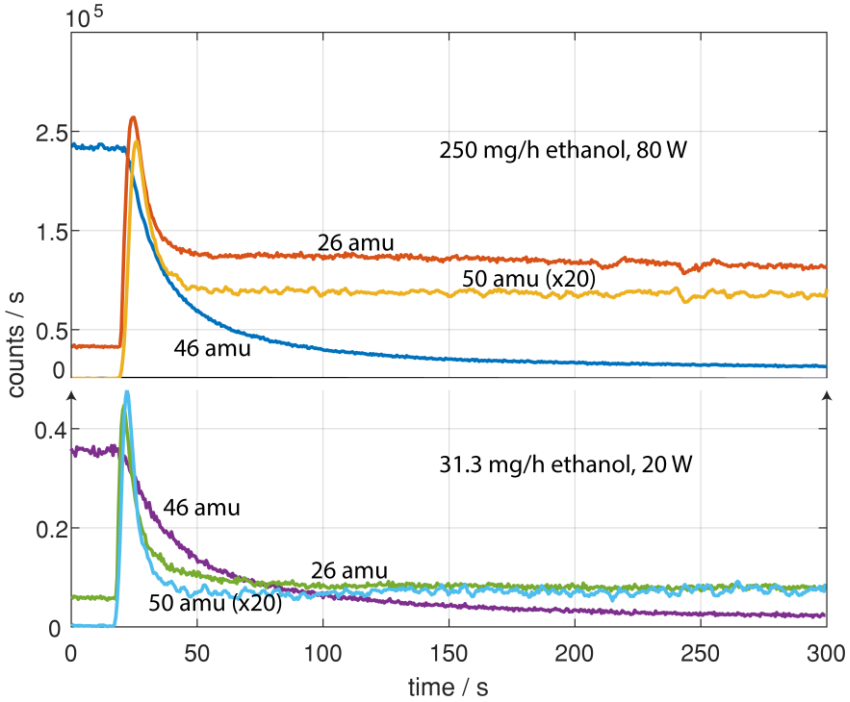

Figure 1: time evolution of ethanol (q/m = 46), acetylene (q/m = 26) and butadiyne (q/m = 50) for high ethanol concentration and high power (top) and low ethanol concentration and low power (bottom).

Statut : PostDoc