

# Promoting Reaction Channels in Dissociative Electron Attachment to Improve the Cross-Linking Efficiency of SAMs for the Production of Carbon Nano-Membranes

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In recent years, the Götzhäuser group (University of Bielefeld) has developed a universal scheme for the fabrication of carbon nano-membranes (CNMs) by electron induced cross-linking of aromatic Self-Assembled Monolayers (SAMs) [1], a process where the cross-linking is mainly attributed to electron induced C-H bond rupture in the monomers through dissociative ionization [2].

Considering the different nature of low energy electron induced processes [3] and in particular the bond rupture selectivity and efficacy of dissociative electron attachment (DEA), we hypothesize it is possible to control the cross-linking and functionalization of CNMs. First experiments in this direction were recently conducted on the halogenated biphenyls: 2-iodo-biphenyl, 2-bromo-biphenyl and 2-chloro-biphenyl, showing significantly enhanced cross-linking efficiency for 2-iodo-biphenyl - an effect that was attributed to the comparably high efficiency of iodine loss from this compound through DEA at threshold [4].

Inspired by these results we are currently trying to improve the electron induced cross-linking of SAMs, promoting reaction channels in DEA through exothermic formation of HF at 0 eV [5,6]. Neutral HF formation is supported by intramolecular hydrogen bonds. Currently we are investigating the influence of intramolecular  $-O\cdots H\cdots F$ ,  $-S\cdots H\cdots F$  and  $-N\cdots H\cdots F$  bonds on DEA to potential SAMs precursors, aiming to enable exothermic HF formation and to investigate this route intermolecularly in the cross-linking process.

## References

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