

EUV-induced surface modification of self-assembled monolayers of furoxans

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We report EUV-induced cleavage of furoxan self-assembled monolayers (SAMs) using high-resolution photoemission spectroscopy (HRPES) and near-edge x-ray absorption fine structure (NEXAFS). When SAMs of 3-methyl-4-furoxancarbaldehyde (FCA) and 4-(4-formylphenyl)-3-phenylfuroxan (FBA) are exposed to soft x-ray or EUV, a N 1s core level peak, which originates from the N(2) nitrogen bonded to two oxygens in a furoxan ring, disappears completely in HRPES and a new structure appears at about 286 eV in NEXAFS. This indicates that two NO molecules in a furoxan are released upon the lights, which is accompanied by the generation of carbon triple bonds. EUV of ~ 750 and 391 mJ/cm^2 are necessary for the reaction of the FCA and FBA SAMs, respectively, suggesting that the SAMs are very sensitive to the shorter wavelength lights and the sensitivity depends on the functional group constituting the SAMs.