SELECTIVE PHOTO BLEACHING OF CARBON CHAIN ABSORPTIONS IN CRYOGENIC MATRICES

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We present results obtained on combined UV-vis photo bleaching and IR spectroscopy performed on the same matrix sample. Using an excimer pumped dye laser we could selectively deplete the species C_9, C_{11}, C_{13} and C_{15} in reactive matrices such as solid oxygen by exposures at the appropriate UV-vis peak absorption wavelengths, which usually are close to those in argon matrices[a]. The correlated decreases in UV-vis and IR line intensities yield information on the IR active vibrations of such long chains. According to our data linear C_{15} exhibits major IR absorptions at 1707-1721 cm^{-1} in oxygen matrices. In the process of photo bleaching we produced as reaction products various higher carbon oxides, most of which seem to be also chain molecules. The characterisation of these species by ^{16}O-^{18}O and ^{12}C-^{13}C isotopic replacement experiments is in progress. We also attempt to assign carbon chains larger than C_{15}.

[a] J.P. Maier; Chemical Society Reviews, 1997, 21 (1997)