IR SPECTROSCOPY OF LONG CARBON CHAINS AND THEIR DERIVATIVES IN CRYOGENIC MATRICES: SPECIES IDENTIFICATION BY $^{13}$C$_{3}$→$^{12}$C$_{3}$ ISOTOPIC SUBSTITUTION.

DMITRY STREJNIKOV and WOLFGANG KRÄTSCHMER, Max-Planck-Institut für Kernphysik, D-69029 Heidelberg, PO Box 103980, Germany.

Along with matrix gas, we co-deposited carbon vapor from two separated carbon evaporation sources, namely a $^{12}$C-source and a $^{13}$C-source. Under the applied conditions the C$_{3}$ molecules are the most abundant species in both carbon sources. We observed that in the formation process of long carbon chains the C$_{3}$ units play a major role. This finding was used to establish a new species identification method based on isotopic replacement. The old technique of atomic $^{13}$C→$^{12}$C substitution can be reasonably applied only for molecules with a small number of carbon atoms ($n$9). Using the new method of molecular $^{13}$C$_{3}$→$^{12}$C$_{3}$ substitution, quite simple distributions having small number of isotopomeric IR absorptions were obtained also for larger species. We present data for C$_{n}$ and C$_{n}$O$_{1,2}$ ($n$6).