IR SPECTROSCOPY OF LONG CARBON CHAINS AND THEIR DERIVATIVES IN CRYOGENIC MATRICES: SPECIES IDENTIFICATION BY $^{13}C_3 \rightarrow ^{12}C_3$ ISOTOPIC SUBSTITUTION.

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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 $^{13}C \rightarrow ^{12}C$ substitution can be reasonably applied only for molecules with a small number of carbon atoms (n9). Using the new method of molecular $^{13}C_3 \rightarrow ^{12}C_3$ substitution, quite simple distributions having small number of isotopomeric IR absorptions were obtained also for larger species. We present data for $C_n$ and $C_nO_{1,2}$ (n6).