

## VIBRATIONAL SPECTROSCOPY OF GERMANIUM-CARBON CLUSTERS: $\nu_4(\sigma_u)$ MODE OF $\text{GeC}_5\text{Ge}$

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Recent results will be presented from FTIR (Fourier transform infrared) and DFT (density functional theory) studies of the vibrational fundamentals and structures of germanium-carbon clusters trapped in solid Ar, which have previously included linear  $\text{GeC}_3\text{Ge}^a$  and  $\text{GeC}_3\text{Si}^b$ . The linear germanium-carbon cluster  $\text{GeC}_5\text{Ge}$  has been detected using FTIR spectra generated when products from the dual laser evaporation of Ge and C rods are trapped in solid Ar matrices at  $\sim 10$  K. Comparison of frequencies and  $^{13}\text{C}$  isotopic shift measurements with the predictions of DFT calculations at the B3LYP/cc-pVDZ level confirms the identification of the  $\nu_4(\sigma_u)$  mode of  $\text{GeC}_5\text{Ge}$  at  $2158.0\text{ cm}^{-1}$ .

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<sup>a</sup>D. L. Robbins, C. M. L. Rittby, W. R. M. Graham, *J. Chem. Phys.* **114**, 3570 (2000).

<sup>b</sup>D. L. Robbins, C. M. L. Rittby, W. R. M. Graham, *J. Chem. Phys.* **117**, 3811 (2002).