HIGH-RESOLUTION INFRARED SPECTROSCOPY OF Ge_2C_3

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Carbon-rich systems are of great importance in diverse areas of research like material science as well as astro- and structural chemistry. Despite this relevance, our knowledge of smaller cluster units is still fragmentary, particularly with respect to investigations at high-spectral resolution in the gas phase. Unequivocal assignment of spectral features to their molecular carriers is critically dependent on predictions from high-level quantum-chemical calculations. In turn, high-resolution studies provide useful information to assess the predictive power of quantum-chemical methods. This is particularly interesting for cluster systems harboring heavy elements for which so far relatively little is known from experiment. With this contribution, we would like to present a recent gas-phase study of a polyatomic germanium-carbon cluster, linear Ge_2C_3 (Ge=C=C=C=Ge), which was previously studied in an Ar matrix[a]. The cluster was produced through laser ablation of germanium-graphite sample rods and observed in a free jet at wavelengths around 5μm. Additionally, quantum-chemical calculations of Ge_2C_3 were performed at the CCSD(T) level of theory. The production and observation of Ge_2C_3 suggests that many more binary clusters should be amenable to high-resolution spectroscopic techniques not only in the infrared but also in the microwave region.

[a] D. L. Robbins, C. M. L. Rittby, and W. R. M. Graham, *J. Chem. Phys.* **114**, 3570 (2001).