

Building Carbon Bridges on and between Fullerenes in Helium Nanodroplets

Content

We report the observation of sequential collisions of fullerenes with C atoms in an extremely cold environment. Experiments were performed inside helium droplets at 0.37 K doped with C₆₀ molecules and C atoms. Our results show that C-atom additions can transform a chemically inert fullerene C₆₀ into chemically reactive carbenes C₆₀(C :)_n.

Carbenes should play an important role in interstellar chemistry. Our experiments demonstrate the reactivity of C₆₀(C :)_n

toward H₂, H₂O, and another C₆₀. We expect similar reactivities toward many other molecules as well as other carbenes such as :CO, :CS, :C_n., :C_nO, and :CNH. This opens the way toward a formation of a new class of fullerene derivatives in the interstellar medium.

Summary

Primary author(s) : Dr. KRASNOKUTSKIY, Sergiy (Laboratory Astrophysics Group of the MPI for Astronomy at the Friedrich Schiller University Jena)

Co-author(s) : Dr. KUHN, Martin (Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria); Dr. KAISER, Alexander (Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria); Dr. MAURACHER, Andreas (Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria); Dr. RENZLER, Michael (Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria); Prof. BOHME, Diethard (Department of Chemistry, York University, 4700 Keele Street, Toronto M3J 1P3, Ontario, Canada); Prof. SCHEIER, Paul (Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria)

Presenter(s) : Dr. KRASNOKUTSKIY, Sergiy (Laboratory Astrophysics Group of the MPI for Astronomy at the Friedrich Schiller University Jena)

Track Classification : MORNING SESSION - GAS, DUST, ICE AND BEYOND