

Abstract Submitted  
for the APR05 Meeting of  
The American Physical Society

**Negative Ions of Bucky-dumbbells** OLGA OVCHINNIKOV,  
ROBERT COMPTON, University of Tennessee, Knoxville — A photochemical route to the formation of two  $C_{60}$  molecules which are bridged by one and up to ten carbon atoms to form a bucky-dumbbell shaped molecule, i.e.,  $C_{60}=C=C_{60}$  to  $C_{60}=C=C=C=C=C=C=C=C=C=C=C=C_{60}$ , will be described. Irradiation of  $C_{60}$  in solutions of chloroform and iodine (magenta color) with pulsed laser light from the frequency tripled (355 nm) Nd:YAG laser produced a dark crimson color. Matrix assisted laser desorption ionization (MALDI) mass spectroscopy using negative ions was used to examine the irradiated fullerenes. Irradiation of solutions under low laser power for short periods of time ( $\sim 1$  hr) gave exclusively  $C_{60}=C=C_{60}$  negative ions. Higher power and longer irradiation times ( $\sim 3$  hrs) produced  $C_{60}=C_n=C_{60}$  negative ions with  $n = 1$  to 10. All values of  $n$  are equally abundant. High performance liquid chromatography was used to separate the bucky-dumbbells from the dominant  $C_{60}$  molecules, confirming the production of the dumbbells in the solution and not in the MALDI. Experiments are underway to examine the multiply charged negative ion properties of these molecules. These studies include electron attachment to the singly charged negative ion, electrospray mass spectroscopy and charge transfer collisions between singly-charged anions and molecules.

Olga Ovchinnikov  
University of Tennessee, Knoxville

Date submitted: 13 Jan 2005

Electronic form version 1.4