

Exploring Ho metallofullerenes

Andrey L. Mirakyan*, Robert D. Bolskar⁺, Mike Alford⁺ and Lon J. Wilson*

* Center for Nanoscale Science and Technology and Department of Chemistry, Rice University, P.O. Box 1892, MS-60 Houston, Texas 77251-1892, USA.

⁺ TDA Research, 12345 W 52nd Ave. Wheat Ridge, CO 80033, USA

Extensive progress in the isolation and study of endohedral metallofullerenes has been achieved in the recent few years. Mainly Sc and La metallofullerenes (La₂@C₈₀, Sc₂@C₈₂, Sc₂@C₈₆ etc.) have been isolated in pure form and characterized by spectroscopic and structural methods. In contrast, Ho metallofullerenes remain relatively unexplored. Our interest in Ho metallofullerenes arises from their possible medical applications as radiopharmaceuticals.[1,2]

Metallofullerene containing soot was produced by the carbon ARC process. After extraction with CS₂, a solution containing various Ho metallofullerenes and empty fullerenes was obtained. Two stage HPLC purification using PYE and PBB columns has led to the isolation of Ho@C₈₂ and Ho₂@C₈₂, characterized by UV spectroscopy and MALDI TOF MS.

The solid residue remaining after the extraction of the original soot with CS₂ consists mainly of Ho@C₆₀, Ho@C₇₀, and Ho@C₇₄. These metallofullerenes are insoluble in the common organic solvents used in fullerene separation, but slightly soluble in some amines like aniline and isopropylamine. Attempts to derivatize these species are being made and available results will be presented.

1. Cagle D. W., Kennel S. J., S. Mirzadeh, J. M. Alford and L. J. Wilson, Proc. Natl. Acad. Sci, USA. 96, 1999.
2. Thrash T. P., Cagle D. W., J. M. Alford, K. Wright, G. J. Ehrhardt, S. Mirzadeh, L. J. Wilson, *Chem Phys. Lett.* **308**, (1999) 329-336