HIGHLANDS IN CHEMISTRY SEMINAR SERIES

STEVEN STEVENSON

PURDUE UNIVERSITY - FORT WAYNE

APRIL 9, 2021

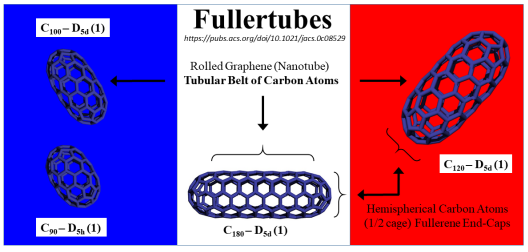
2:30PM ET

ZOOM

FACULTY HOST:
HARRY DORN

"Fullertubes: Long-Awaited, Experimental Discovery, Separation, and Isolation of a Missing Family of Pristine, Carbon Molecules"

During the last 30 years, there has been a continual discovery of novel, all-carbon structures, i.e., fullerenes, nanotubes, graphene, and just recently in 2020, fullertubes. The structure of these newly isolated molecules [fullertubes] consists of fullerene-based, hexagonal and pentagonal endcaps combined with a tubular region solely of hexagonal carbon, i.e., analogous to the belt region of nanotubes that resembles a rolled graphene sheet. Fullertubes, unlike spherical fullerenes resemble endcapped single-wall nanotubes (SWNTs). Depending on their diameter and chirality, fullertubes could exhibit metallic properties. Furthermore, fullertubes are actual pristine molecules with defined molecular weights and characteristic molecular properties. Fullertubes can be viewed as a "bridging family" of molecules that are intermediate between spheres and tubes. For example, consecutive belts of 10-carbon or 12-carbon atoms are inserted into the tubular belt to create sequentially longer fullertubes (e.g., C90, C100, C120, C150, C180, etc.) with increasing aspect ratios. Although the structure of fullertubes was conceptually predicted many years ago, there was no experimental evidence such a family of structures existed or could be isolated. In this presentation, I will discuss the fullertube discovery, the new chemical separation science that opened the door to their isolation, and introduce their seminal characterization. Worldwide interest in these new tubular all carbon molecules is high, and I will also discuss possible applications for these new fullertubes.



COLLEGE OF SCIENCE
CHEMISTRY
VIRGINIA TECH