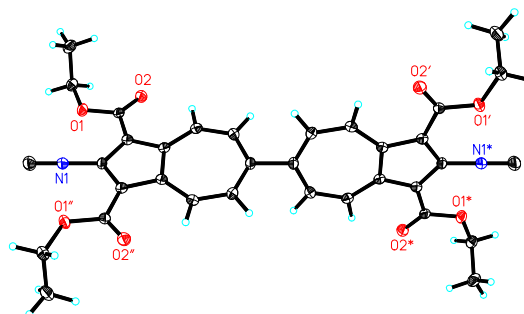


Azulene-based organometallics relevant to molecular electronics

Substances incorporating the azulenic motif (a nonbenzenoid aromatic framework involving fused 5- and 7-membered carbon rings) have been gaining increasing interest in the design of advanced materials. Because of its remarkably low aromatic delocalization energy and asymmetric current/voltage characteristics, the azulenic moiety is particularly attractive as a charge transport mediator on the molecular scale and as a critical component in molecular switching systems.

In the past few years, the Barybin group pioneered design of several azulenic linkers and demonstrated their electronic superiority to the corresponding benzenoid bridges. Our 2010-2012 REU projects will be aimed at developing syntheses of linear *biazulenic* linkers, as well as investigation of their properties related to electron delocalization and transport within metal-organic frameworks. X-ray structure of the first example of such a linker fitted with conducting isocyanide



“alligator clips” is illustrated to the right. The NSF-REU participants will acquire experience in organic, coordination, and organometallic syntheses (including air-free manipulations) and learn the basics of operation and interpretation of many techniques such as electrochemistry, electronic spectroscopy, X-ray crystallography, multinuclear NMR, FTIR, and magnetic measurements.

Number of peer-reviewed publications with undergraduate co-authors: 3 (*JACS*, *Organometallics*, *Langmuir*), including 3 with REU co-authors.