

CHEMISTRY COLLOQUIUM

Friday, October 9, 2009
11:25 AM, Room 111, Life Sciences

*“Archaeological Chemistry of Rock Paintings:
Radiocarbon Dating and Chemical Analysis”*

Ruth Ann Armitage
Department of Chemistry
Eastern Michigan University

Rock paintings, or pictographs, are unique cultural remains that are difficult to place into archaeological contexts because they are not a part of the buried stratigraphic record of a site. Direct radiocarbon dating of the paint itself would ideally be used to determine their age. The paint is typically an inorganic pigment (iron oxides and hydroxides are common) presumably mixed with an organic binder or vehicle to make the paint flow and adhere to the rock surface. Dating rock art by conventional radiocarbon techniques would have required completely destroying the paintings; the advent of accelerator mass spectrometry (AMS) for direct measurement of ^{14}C changed that. A plasma-chemical oxidation method was developed in the 1990s to selectively remove organic carbon from small samples of paintings, yielding CO_2 for radiocarbon analysis by AMS. Some paintings contain easily recognized organic material, such as charcoal, but most do not. At EMU, we are using chromatographic and mass spectrometric methods to determine the nature of the organic material present in rock paintings, and using the plasma-chemical oxidation/AMS method to date them. Results of our work on paintings from locations around the world will be presented.

Bio:

Ruth Ann Armitage earned a B.A. in Chemistry from Thiel College (Greenville, PA), and completed a Ph.D. in Analytical Chemistry at Texas A&M University on radiocarbon dating of charcoal-pigmented rock paintings. Since 2001, Dr. Armitage has been on the chemistry faculty at Eastern Michigan University. She and her students are currently using such analytical methodologies as GC-MS and ATR-FTIR to characterize and date by plasma-chemical oxidation-AMS archaeological materials, including rock paintings, fragile organic artifacts, and residues.