

Tobacco Science Research Conference

INSTRUCTIONS FOR THE PREPARATION OF ABSTRACTS

Circle one: **Presentation** **Poster**

Please type name, address, phone and email of the principal author below.

NOTE: The abstract must contain a meaningful summary of the material to be presented. It must include the objectives of the research efforts, the methods used, and the results obtained. The editorial committee reviews and accepts papers based on the abstract. Very short or vague abstracts will not be accepted.

Phillip F. Britt
Chemical and Analytical Sciences Division
Oak Ridge National Laboratory
Bld 4500N, MS 6197, P.O. Box 2008
Oak Ridge, TN 37831-6197
Phone: (865) 574-5029; E-mail: brittpf@ornl.gov

Circle one:
35 mm slides

PowerPoint

FORMATION OF POLYCYCLIC AROMATIC HYDROCARBONS FROM THE GAS-PHASE PYROLYSIS OF TERPENES AND STERYL ESTERS AT SHORT RESIDENCE TIMES. Phillip F. Britt, A. C. Buchanan, III, and Clyde V. Owens, Jr., Oak Ridge National Laboratory, P. O. Box 2008, Oak Ridge, TN 37831-6197.

It is generally believed that the compounds found in the nonpolar extract of tobacco, such as steroids, terpenes, fatty acids and their esters, and aliphatic hydrocarbons, are the major precursors of the polycyclic aromatic hydrocarbons (PAHs) found in tobacco smoke. Although the gas-phase pyrolysis of these tobacco components have been investigated, the studies typically used long residence times (>5 s to minutes) which are not relevant to the short gas-phase residence times (<1 s) found in a burning cigarette. Our previous investigations on the pyrolysis of steroids have shown that at short residence times (<1 s), PAH yields are much lower than those previously reported. This fact questions the importance of gas-phase reactions in the formation of PAHs in the smoldering combustion of tobacco. To determine the role of residence time and temperature on the formation of PAHs from other tobacco components, the gas-phase pyrolysis of terpenes, such as solanesol, β -carotene, and squalene, steryl esters, such as cholesteryl stearate, cholesteryl oleate, and cholesteryl linolenate, and the nonpolar extract from a Bright tobacco, was investigated at short residence times (0.13 – 1.0 s) and at temperatures from 600-800 °C under a flow of an inert gas. Surprisingly, PAH yields from the pyrolysis of solanesol were significantly smaller than expected and only small amounts of benzo[a]pyrene were found at 800 °C and 1.0 s residence time. Similar results were found for the other terpenes, while the steryl esters were found to produce more PAHs than the terpenes at lower temperatures (i.e., 700 °C).

Research sponsored by Philip Morris, USA, ERD9801660, U.S. Department of Energy, under contract DE-AC05-00OR22725 with Oak Ridge National Laboratory, managed and operated by UT-Battelle, LLC.

"The submitted manuscript has been authored by a contractor of the U.S. Government under contract No. DE-AC05-00OR22725. Accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes."