

Reddy, C.M., Xu, L., and O'Connor, R., *Using radiocarbon to apportion sources of polycyclic aromatic hydrocarbons in household soot*, *Environmental Forensics*, 2003; v4, 191-197

To det. whether polycyclic arom. hydrocarbons (PAHs) in household soot were derived from the combustion of scrap wood or creosote that was impregnated in the wood (or some combination of both), the mol. compn. and radiocarbon (^{14}C) content of the total carbon and several PAHs in the soot was studied. The 5730-yr half-life of ^{14}C makes it an ideal marker for identifying creosote-derived PAHs (^{14}C -free) vs. those derived from the combustion of wood (contemporary ^{14}C). The ^{14}C abundance of phenanthrene, fluoranthene, pyrene, and retene was detd. by accelerator mass spectrometry after solvent extn. and purifn. by preparative capillary gas chromatog. The mol. anal. (presence of retene and 1,7-dimethylphenanthrene) and bulk ^{14}C content (contemporary) of the soot indicated that wood combustion was a strong source of carbon to the soot. The ^{14}C of retene in two soot samples was also contemporary, indicating that it was derived from the combustion of the scrap wood. These results are consistent with previous work that suggested that retene is an excellent marker of wood combustion. However, the ^{14}C content of phenanthrene, fluoranthene, and pyrene in one soot sample was much lower and revealed that these compds. had a mixed creosote and wood source. Using an isotopic mass balance approach, the authors est. that 40 to 70% of phenanthrene, fluoranthene, and pyrene were derived from the combustion of the scrap wood. The results of this study show that mol. marker and bulk ^{14}C anal. can be potentially misleading in apportioning sources of every PAH, and that mol.-level ^{14}C anal. of PAHs can be a powerful tool for environmental forensics.