

**Dr. Jerome Nriagu***Photo by Bob Kalmback*

andles and Air Pollution

A University of Michigan School of Public Health study of candles that were purchased from stores in southeast Michigan shows that some candles on the market today are made with wicks that have either lead or lead cores that emit potentially dangerous levels of lead into the air.

The study is by Jerome Nriagu, professor of environmental health sciences, who examined lead emissions from 15 brands of candles made in the United States, Mexico, and China. He also examined the concentration levels of lead that lingered in the air in an enclosed space, such as a 12 x 12 x 10-foot room, after a one-hour burn and then after a five-hour burn.

Nriagu's study showed that lead emission rates for the candles ranged between 0.5 and 327 micrograms per hour. After burning candles from all 15 brands for one hour, the lead levels lingering in the air of an enclosed space were estimated to range from 0.04 to 13.1 micrograms per cubic meter. The U.S. Environmental Protection Agency recommendation for lead levels in the air is 1.5 micrograms per cubic meter for ambient air.

Candles produced in China and the United States released the highest levels of lead into the air. In general, Nriagu found that metal cores in candles from China were made of either pure lead or lead alloy while those made in the United States or Mexico consisted of zinc or lead-containing alloys. Regular exposure to lead in this manner in confined spaces could pose health risks to people with weak immune systems, especially children and the elderly, Nriagu said.

Source: Reyes, A. (1999, October 18). "Some Candles Emit Potentially Dangerous Levels of Lead." *The University Record*, 55(7), Article 8. Retrieved August 22, 2004, from http://www.umich.edu/~urecord/9900/Oct18_99/8.htm. Reprinted with permission from The University Record at the University of Michigan.

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1. What was Dr. Nriagu's hypothesis for his experiment?
 2. How did Dr. Nriagu perform his experiments?
 3. Were all the candles equally harmful? How do you know?
 4. How much above the recommended lead level was the most polluting candle?