

**The mechanism by which Polonium 218 acquires a positive charge.**

As Radon-222 decays, it emits an alpha particle ( 2 protons and 2 neutrons), and the residual Po-218 nucleus rebounds in the opposite direction. The initial kinetic energies are 5.49 MeV and 119 keV respectively. Both of them lose their energies by the end of their path and the energy loss rate of the Po-218 nucleus is four times that of the alpha particle. Thus substantial local molecular excitation and ionization occur.

As the alpha particle leaves the Rn-222 atom it will autoionize the residual Po-218. As it recoils, its velocity will be greater than that of the bound, outer shell electrons, and thus will become a highly charged ion. As it slows, it picks electrons back up so that it is almost neutral by the time that it reaches thermal velocity and thus 88 percent are singly charged positive ions and 12 percent are neutral ( Wellisch, 1913; Porstendorfer and Mercer, 1979; Chu and Hopke, 1985).

Add this to my earlier theory as a footnote. My thanks to Lin Fei and Dr. Philip K. Hopke of Clarkson University. The fact that a recoil nucleus can simply leave the outer shell electrons behind eluded me at first.

What we have then is a highly selective ion attraction device in the form of a TV set.

Another way to phrase it is that a TV screen is actually an Electrical Mobility Spectrograph. My name for it would be "Selectrostatic Spectrograph".

Based on my measurements of random dust in real homes compared to dust on TV screens in the same homes, it would seem that there is no equilibrium in the radon progeny distribution in the air mass due in large part to electrostatic mobility of the ionized ambient aerosols, ions, molecules and small clusters.

Charcoal adsorption of Rn-222 gas is effective for an undisturbed environment/ nonturbulent air due to Radon being a noble gas and inert, but in real world environment there is a much more dynamic diffusion factor to be considered caused by the "electrode effect" and electrostatic bias. Polonium on the other hand is very chemically active and can combine in many processes, including with oxygen to form Polonium Oxide.

A practical detector design that might help test this theory would consist of three CR-39 plates ( home labs might try CD discs) placed in a test chamber ( or basement). One would carry a positive charge, one a negative charge and the third would be neutral. After a measured time in the chamber, the three plates would be processed and analyzed for alpha deposition.

In the meantime we can continue to harvest the radon progeny directly from the TV and computer screens in active environments, use a standard 1-3/4 inch swipe\* slightly dampened with dilute acetic acid ( vinegar). Readout can be with a 2 inch pancake detector shielded with a paper card for Beta/Gamma and without the card for Alpha-Beta-Gamma, or your favorite detection system.

Perhaps a makeshift electrostatic precipitator could be powered by a simple piezoelectric generator.

\*for home labs, a coffee filter paper, cut to size with scissors or use a Jumbo Paper Punch by "Whale of a Punch". by EK Success Co.

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