

A NEW PERSONNEL ALBEDO NEUTRON DOSIMETER
USING TRACK ETCH DETECTORS - DESIGN AND PERFORMANCE

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ABSTRACT

A new personnel neutron dosimeter which makes use of electrochemical track etch detectors and applies the albedo principle is introduced. A track etch detector in contact with two (n, α) converters is contained in a boron loaded plastic capsule with different boron thicknesses to allow for separate dose estimations of thermal, intermediate and fast neutrons. For calibrations in stray neutron fields a new aspect is presented to correct for the local change of the albedo response. The angular dependence and the measurable dose range are discussed.

SESSION 3.3: RADON MONITORING
Chairman: D. Lal

RADON TRANSPORT IN THE EARTH: A TOOL FOR URANIUM
EXPLORATION AND EARTHQUAKE PREDICTION

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ABSTRACT

The ^{222}Rn concentration in the ground near the surface of the earth provides a sensitive signal for recognizing subterrestrial flow of fluids. Such flows can indicate the existence of regions of enriched ^{222}Rn and hence the presence of subsurface uranium ore. If such flows are caused by stress buildup prior to earthquakes, they can give premonitory signals. Systematic variations in near-surface radon have been observed near ore deposits and in earthquake zones, and are ascribed to subterrestrial flow of fluids.

Changes in radon concentration have been seen that are not ascribable to earthquake-related effects. Temperature, pressure, moisture, and prevailing winds have been considered but do not correlate with the radon changes. Earth tidal triggering of these events is the only known possibility that presently cannot be ruled out; it is being assessed.

Earthquake related changes in radon concentration have been measured at considerable distances from the hypocenters of earthquakes. A simple dislocation model leads to estimates of distance that increase to hundreds of kilometers at earthquake magnitudes of five and above. The essential components of the theory are that the stress from a dislocation loop varies at large distances x as x^{-3} , while the stress value increases with the magnitude of the earthquake represented. A threshold sensitivity is inferred from our radon measurements associated with earthquakes near Blue Mountain Lake, New York. A global ^{222}Rn -monitoring network is desirable for earthquake prediction.