Abstract Submitted
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UV Enhancement of CR-39 Nuclear Track Detector Etch Parameters[1] NATHAN TRAYNOR, CHRISTOPHER MCLAUCHLIN, KENNETH DODGE, JAMES MCLEAN, STEPHEN PADALINO, Dept. of Physics and Astronomy, State Univ of NY at Geneseo, Geneseo, NY, MICHELLE BURKE, CRAIG SANGSTER, Laboratory for Laser Energetics, University of Rochester, Rochester, NY — CR-39 plastic is an effective and commonly used solid state nuclear track detector. High-energy charged particles leave tracks of chemical damage. When CR-39 is chemically etched with NaOH at elevated temperatures, pits are produced at the track sites that are measurable by an optical microscope. We have shown that by exposing the CR-39 to high intensity UV light between nuclear irradiation and chemical etching, the rate at which the pits grow during etching is increased. The effect has been observed for wavelengths shorter than 350 nm, to at least 250 nm. Heating of samples during UV exposure dramatically increases the etch rates, although heating alone does not produce the effect. The pit enhancement is the result of an increase in both the bulk and track etch rates, while the ratio of these rates (which determines sensitivity to particles) remains roughly constant. By determining the best processing parameters, this effect promises to significantly reduce the time required to process CR-39 track detectors.

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