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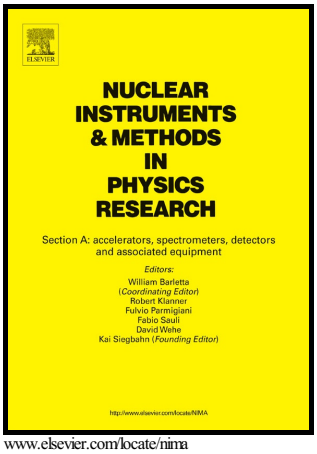

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Development of High Temperature, Radiation Hard Detectors Based on Diamond

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Abstract

Single crystal CVD diamond has many desirable properties compared to current, well developed, detector materials; exceptional radiation, chemical and physical hardness, chemical inertness, low Z (close to human tissue, good for dosimetry), wide bandgap and an intrinsic pathway to fast neutron detection through the 12C(n,α)9Be reaction. However effective exploitation of these properties requires development of a suitable metallisation scheme to give stable contacts for high temperature applications. To best utilise available processing techniques to optimise sensor response through geometry and conversion media configurations, a reliable model is required. This must assess the performance in terms of spectral response and overall efficiency as a function of detector and converter geometry. The same is also required for proper interpretation of experimental data. Sensors have been fabricated with varying metallisation schemes indented to permit high temperature operation; Present test results indicate that viable fabrication schemes for high temperature contacts have been developed and present modelling results, supported by preliminary data from partners indicate simulations provide a useful representation of response.

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