

Paramagnetic centers induced in cubic zirconia by 2.5-MeV electron and 2.6-GeV uranium ion irradiations

Costantini JM, Beuneu F, Grynszpan RI, Trautmann C

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We have used electron spin resonance to study the defects induced in yttria-stabilized zirconia single crystals by 2.5-MeV electron and 2.6-GeV uranium ion irradiations. In addition to the O^- and Zr^{3+} paramagnetic centers already observed after X-ray irradiation at $g = 1.98$ and $g = 1.89$, we bring clear evidence of an unknown paramagnetic center at $g = 1.96$ induced by charged particles. For the O^- center, a maximum of the integrated spin intensity occurs near 50 K, suggesting some antiferromagnetic spin-pairing effect. Respective contributions of the ionization and atomic displacement processes in defect production are addressed.