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Influence of the conical shape of the latent tracks near the irradiated surface on the correct measurements of the latent track size

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The difference in track parameters registered in some oxides at the same energy loss and different ion beam energy, so called “velocity effect” have been evidenced by number of experimental methods. Most of corresponding data on damage cross-section and then on the track radii were found by means of Channelling Rutherford Backscattering Spectroscopy or X-ray diffraction while the contribution of TEM results in the whole data array still remains very limited. In this report we give analysis of existing TEM results related the “velocity effect” and consider how the conical shape of latent tracks observed in the subsurface region of the swift heavy ion irradiated oxides may affect the correct determination of the track size as well as the critical electronic energy loss for track formation. The discussion is based on our cross-sectional TEM studies of high energy Bi and Xe ion induced latent tracks in TiO₂ and Al₂O₃ single crystals.

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