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Surface Hardening Efficiency of Medium-Energy Light Ions on Polycarbonate

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Implantation of light ions (B, C, N, O, and F) into polycarbonate was performed in the energy range 150 keV to 8 MeV. The resulting increase in surface hardness, measured by nanoindentation, was correlated with ion mass and energy. The hardening efficiency, defined as the increase in the maximum nanoindentation hardness per unit fluence, was similar for all ion species at low energy, but diverged significantly at higher energy. A strong correlation with Monte Carlo calculations of deposited ionization energy was observed. The effect of normalizing to ionization stopping, as well as nuclear, will be presented.

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