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RD50 Status: Developing radiation tolerant materials for ultra rad-hard tracking detectors

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The need for ultra-radiation hard semiconductor detectors for the tracker regions in high energy physics experiments at a future high luminosity hadron collider like the LHC Upgrade has led to the formation of the CERN RD50 collaboration. The R&D directions of RD50 follow two paths: understanding radiation effects, and finding mitigation through the use of new materials, device engineering and optimized operations, all of which will be covered in this paper. We will compare recent data on charge collection in new materials with electrical characterization, and show the effects of trapping, loss of full depletion and leakage current as a function of accumulated fluence of hadrons. An emerging picture of how a future tracking detector might look like will be presented.

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