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The Effect of Irradiating AlN on its Dielectric Properties

Aluminum Nitride is an active element of sensors that monitor the performance and well-being of the nuclear reactors due to its piezoelectric properties. Yet, the variations of its properties under irradiation are largely unexplored. Here, we report the results of the molecular dynamics simulations of the structural changes in AlN under irradiation via the knock-on atom technique. By creating and evolving the irradiation cascades due to energetic particle interaction with the atom of the crystalline lattice we determine the rate of the defect production as a function of the deposited energy. Further, we determine a displacement energy, a key characteristic that describes how efficient the defect production in the given material is. Comparison with the isostructural GaN is provided.

Sean Anderson is a Senior Physics major from Warrensburg, Missouri, and is also pursuing a minor in Computer Science. He is an active member of the Society of Physics Students on campus, and serves as their Vice President. It is with the SPS that he first heard of and got the chance to work with Professor Chernatynskiy, and worked with him for a semester before joining the OURE program.. He plans to graduate in 2022, and plans to move on to Grad School after that.