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Characterization of Si and C implantation induced defects in 4H-SiC VENKATA KUMMARI, MANGAL DHOUBHADEL, BIBHUDUTTA ROUT, TILO REINERT, University of North Texas, DANIEL SPEMANN, University of Leipzig, WEILIN JIANG, Pacific Northwest National Laboratory, FLOYD MCDANIEL, University of North Texas, UNIVERSITY OF LEIPZIG COLLABORATION, PACIFIC NORTHWEST NATIONAL LABORATORY COLLABORATION
— Silicon Carbide is considered to be a promising material for dilute magnetic semiconductors (DMSs). Past experimental studies reveal that ferromagnetism can be observed in SiC diluted with 3d transition metals. Recent studies, based on first principle calculations, show that for SiC monolayers, the presence of silicon vacancies (V_{Si}) may induce local magnetization. However, no spin polarization occurs for carbon vacancies (V_C), Si+C divacancies, and Si-C antisite defects. Ion implantation is an excellent technique to create vacancies for defect induced magnetism. We have implanted Si and C into 4H-SiC at low energy 60 keV to study the implantation defects for different fluences which corresponds to different percentages of simulated damages (e.g. 10 – 60 %) obtained using Monte-Carlo simulations code SRIM/TRIM-2008. Defect disorder after ion implantation has been investigated using Rutherford Backscattering Spectrometry/Channeling (RBS/C) and Raman spectroscopy.

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