

Abstract Submitted  
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**Investigation of Mn incorporation on GaN(0001) by spin-polarized STM**<sup>1</sup> YUN QI, M. WEINERT, L. LI — We investigate the Mn substitution of Ga on GaN(0001) by spin-polarized scanning tunneling microscopy (SP-STM) using a Fe coated W tip. The GaN films are grown by plasma-assisted MBE on 6H-SiC(0001), with a metallic pseudo-1x1 (denoted “1x1”) surface, consists of 2.3 ML Ga on top of the Ga-terminated GaN. Mn deposition on this surface results in the formation of domains of 5x5 and  $5\sqrt{3} \times 5\sqrt{3}$  structures. First principles calculations show that Mn substitution of Ga leads to virtual bound states with bandwidth of  $\sim 1.5$  eV, indicating significant Mn-Ga interactions. We propose that Mn substitution of Ga freezes the Ga motion in the adlayer of the “1x1”, forcing the extra Ga atoms of the top layer to “pop up” and reside at the  $T_4$  sites, forming the (5x5) reconstruction similar to the DAS structure observed on Si(111) surface. With the Fe/W tip, the regions that contain the incorporated Mn would give rise to the extra bright features that form the  $5\sqrt{3} \times 5\sqrt{3}$  structure, due to the higher spin DOS at Mn sites. Implications of these results for understanding the magnetic coupling between Mn atoms in GaN will be discussed at the meeting.

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