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Structure and composition of the 4H-SiC surface and dielectric interface

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Abstract: The 4H polytype of silicon carbide (SiC) is a promising candidate for high temperature and high power metal-oxide-semiconductor device applications. It is also used in the formation of graphene on SiC. In such applications high quality surfaces and interfaces are critical. For power MOSFETs the limit to application has been the dielectric/SiC interface which gives rise to a low inversion layer mobility. This is in sharp contrast to Si/SiO_2 interfaces. This talk will describe the work of our team (see below) in characterizing and modifying the interface to raise the mobility by a factor of ~100 in the last 10 years. The current mobility values, although adequate for commercial devices, remain below expectation and require further research.

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