SESSION 6
GaN MATERIALS

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This session on GaN materials provides useful solutions to basic issues faced by people growing GaN on non-native substrates. The first paper is co-authored by an alliance of researchers in Singapore and MIT, along with Aixtron. They developed a method to reduce the stress during epitaxial growth of GaN HEMTs on 200 mm silicon and thereby reduce the bow and improve device characteristics. In the second paper, by Translucent, GaN layers were grown on Si (111) by MOCVD using a single crystal rare-earth oxide buffer epitaxially grown by MBE. This buffer reduces the mechanical strain that normally develops between the III-N layer and the substrate. It also serves as a barrier against Si diffusion and prevents back-etching. The third paper, by American Society for Engineering Education, et al, studied the effect of substrate thinning on the characteristics of AlGaN/GaN HEMTs on 4-inch (111) Si substrates. Thinning increased substrate strain. High temperature annealing of thinned substrates lead to cracking of the AlGaN layer, increased sheet resistance and decreased HEMT drain current. The final paper of the session, by the National Research Council and NRL, compares two capping structures to protect the GaN during high temperature annealing. Adding a sputtered AlN cap to the dual-layer MOCVD cap, improves the crystalline quality and enables high temperature processing.