Ceramic matrix composites (CMCs) are enabling propulsion material systems for hot-section components of advanced aeroengines for improvement in power and fuel efficiency due to their higher temperature capability and much lighter weight as compared to current metallic counterparts. However, there are still persistent issues regarding transition and maturation of CMCs to engine applications, attributed to their susceptibility to environmental degradation in harsh engine operations. These environment-associated issues include foreign object damage (FOD), erosion, sand dust ('CMAS'), and thermomechanical and thermochemical loading/reactions, all leading to material degradation with its degree depending on the condition or austerity of engine operations. These issues need to be explored and taken into account for design of related material systems and components as well. Some of these issues including FOD, erosion, sand dust, and thermomechanical aspects will be presented and discussed as to how they have effects in advanced, gas-turbine grade SiC/SiC CMCs that are currently considered as engine component materials.