SiC/SiC composites are candidate materials for fusion applications due to their potential to retain strength and exhibit tough behavior at elevated temperatures. The irradiation stability of monolithic beta-SiC has been well studied and the mechanical property evaluation of SiC/SiC composites has been started under the standard test method of Continuous Fiber reinforced Ceramic Composites (CFCC’s). It is important to know the initiation, coalescence and growth of crack in SiC/SiC composites. However there are no good tests for measuring the crack propagation at fracture of SiC/SiC composites than before. After mechanical testing, microstructure analysis of fracture region in SiC/SiC composites by Focused Ion Beam (FIB) was done, though the artifact during TEM specimen preparation would be introduced sometime. Recently we successfully developed a piezo driven nano indenting equipment for observation of crack propagation in SiC/SiC under the irradiation by High Voltage Electron Microscope (HVEM). Preliminary result of in-situ observation of shear crack propagation at the interface between SiC fiber and SiC matrix by HVEM shows a good agreement with the result of out situ experiment by using the cross section TEM specimen at the shear fracture interface between SiC fiber and SiC matrix prepared by FIB after the fiber pushing out testing by the nano indenter. The shear crack initiated and propagated at the interface between SiC matrix and carbon coated layer on the SiC fiber. Results of in-situ observation of crack propagation at W and SiC joining interface will be also presented.