• SiC/SiC(N) composites show good thermal shock resistance, a low coefficient of thermal expansion and excellent physical and chemical stability at elevated temperatures and are therefore promising candidates for various applications in gas turbines

• Liquid silicon infiltration (LSI) is a technique with short process times to obtain composites with low porosity. In this 3-step process, a phenolic resin based carbon precursor is infiltrated in fibre preforms and thermally cured and pyrolysed. Liquid silicon infiltration leads to a reaction of the carbon matrix with silicon to silicon carbide

• To protect the SiC fibre from attack of the melt and to simultaneously create a damage tolerant crack behaviour, a functional fibre coating is crucial. Fig. 3a shows such a coating consisting of Si-doped BN as inner layer and SiC as outer layer

• Polymer Infiltration and Pyrolysis (PIP) is another technique characterised by infiltrating and curing a silicon-organic precursor and afterwards converting the precursor to a ceramic matrix by pyrolysis. Due to an occurring shrinkage of the precursor during pyrolysis, this process has to be repeated several times to decrease the porosity

To improve the oxidation resistance, a plasma sprayed yttrium silicate environmental barrier coating is under development (Fig. 1c)