**Supporting Information**

Joining of SiC ceramics using CaO-Al2O3- SiO2 (CAS) glass ceramics

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1. **Discussion on the bubbles formation**



Fig. S1 Top view (a) and cross-sectional microstructure of the CAS/SiC interface (b) heated at 1200 ℃/10 min.

Fig. S1 shows the microstructure of the CAS/SiC interface heated at 1200 ℃/10 min. When the heating temperature was low, there were lots of bubbles formed inside the CAS glass.

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Figure S2 Characterization of the microstructure of the CAS/SiC wetting interface heated at 1400 ℃/10 min

Fig. S2 shows the microstructure of the CAS/SiC wetting interface heated at 1400 ℃/10 min. With the increase of the heating temperature, the central part of the CAS glass was free of bubbles. No reaction will happen between the CAS glass and the SiC substrate. Also, it is reported that no bubbles formed when the SiC substrate was wetted by the CAS glass under vacuum condition [[1](#_ENREF_1)]. So the bubbles formed in this research must be related to the air. SiC has been reported to be oxidized and CO will form as the reaction product [[2](#_ENREF_2)], which can be origin of the bubbles. However, from Fig. S2, one can note that only the front edges of the CAS glass are occupied by bubbles. The central part of the wetting interface, however, is well protected by the CAS glass and no bubbles formed there. Nevertheless, when the heating temperature gets lower to 1200 ℃, bubbles formed everywhere inside the wetting interface. According to [[3](#_ENREF_3), [4](#_ENREF_4)], bubbles can also form due to the residual air trapped inside the CAS glass. So when the heating temperature is low, there are lots of gaps between the CAS powders, which contributes to the bubbles formation. Meanwhile, the viscosity of the CAS glass is high at low temperatures and the bubbles can hardly evaporate out. That explains why pores can be easily found inside the brazed seam at low temperatures (1300 ℃, Fig. 8 (a) and (b) in the revised manuscript).

**References:**

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