

Melting Relations of Ab-H₂O-H₂ and Qtz-Ab-H₂O-H₂ at 2 kbar

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The vapor-saturated solidi of NaAlSi₃O₈-H₂O-H₂ and SiO₂-NaAlSi₃O₈-H₂O-H₂ systems at 2 kbar over the range of gas phase composition from pure water to X(H₂O)_v=0.1 were studied in the internally heated gas-media pressure vessel. Various H₂O/H₂ fluid compositions were controlled directly rather than by using solid buffers. The results show that the melting temperatures decrease in the X(H₂O)_v range from ~1 to 0.7 compared to H₂O-saturated curves under relevant water fugacities. At X(H₂O)_v=0.91 for albite and 0.953 for Qtz-Ab eutectic the solidus curves have a pronounced minimum with the temperature depression of ~30°C. The further addition of H₂ to the gaseous mixture leads to the increase of melting temperatures. In the region of WI-buffer the temperatures of solidi are about 50°C higher than hydrous Ab and Qtz-Ab under the pure water fugacity equal the partial one in the H₂O-H₂ mixture. The melting point of 1078°C for Ab and 987°C for Qtz-Ab in pure hydrogen has been calculated by an extrapolation of H₂O-H₂ data.