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## **Subsolidus and melting experiments of a K-rich basaltic composition to 27 GPa: Implication for the behavior of potassium in the mantle**

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### **ABSTRACT**

Subsolidus and melting experiments of a K-rich basaltic composition have been performed to 27 GPa. Pyroxene and majoritic garnet contain significant amounts of  $K_2O$  (1–2 wt%) at 6–12.5 GPa and above 22.5 GPa, respectively. Both pyroxene and garnet may act as main reservoirs for K in the mantle. Sanidine ( $KAlSi_3O_8$ ) or its polymorph potassium hollandite is the first phase to be melted up to 20 GPa, but potassium hollandite becomes a liquidus phase at  $P \geq 22.5$  GPa. In contrast to its typical incompatible behavior at low pressures, potassium is a compatible element in the deep mantle, at least in basaltic systems. This compatible behavior implies that a K-rich melt like kimberlite is difficult to generate at lower mantle conditions.