

## **The formation of tonalite and granodiorite magma from Venusian tholeiitic basalt**

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Sodic tonalite-trondhjemite-granodiorite (TTG) rocks are derived by partial melting of mafic crust either at subduction or intra-plate tectonic settings and are a major component of terrestrial Archean Cratons. The rock compositions and crustal thickness estimates of Venus indicate that suitable conditions exist for the generation of TTG magmas. Here, we report the results of high pressure equilibrium partial melting experiments using a parental composition similar to the basalt measured at the Venera 14 landing site in order to determine if TTG-like melts can be generated. It was found that at pressures of 1.5 GPa and 2.0 GPa and temperatures of 1080°C, 1090°C, and 1285°C that tonalitic and granodioritic melts can be generated and are similar to the Archean sodic TTG series. The experimental results indicate that tonalite and granodiorite may be able to form in the absence of plate tectonics in the crust of Venus providing the thermal regime is suitable and that the lower crust is basaltic. A major implication is that the crust of Earth and Venus may have evolved along parallel paths prior to the initiation of plate tectonics.