Cracks in rock

Cracks in granite where radioactive waste is to be stored are important because they are a potential pathway back to the environment for radionucleides. Three kinds of boundaries are present in quartz grains in granite: grain boundaries, sub-grain boundaries (formed by plastic deformation when the rock is hot), and cracks (formed by deformation at cooler temperatures).

Fig. a: A polished section of granite. The dark phase in the top right hand corner is biotite, a highly anisotropic phyllosilicate. The phase with the parallel texture appearance is plagioclase, the texture being due to zoned crystals ranging from oligoclase to andesine in composition. The third phase is quartz; within the quartz, subgrains can be identified. Rayleigh waves fringes indicate the presence of cracks.
Frequency: 400MHz

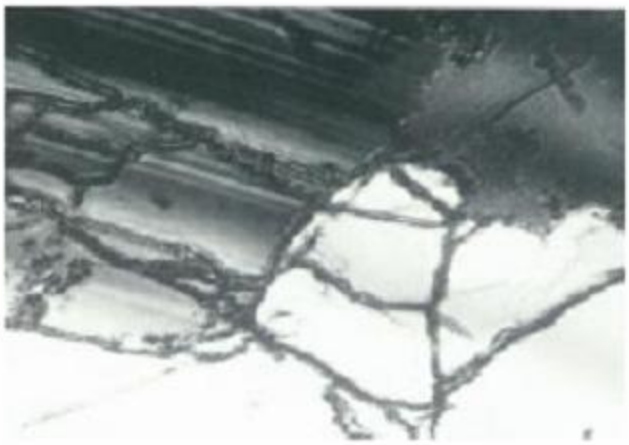

Fig. b: Two grains of quartz in a polished section of granodiorit. The marked contrast in the grain in the upper part of the picture reveals intracrystalline structure that is considerably harder to find by extinction contrast in transmitted polarised light microscopy.
Frequency: 400MHz

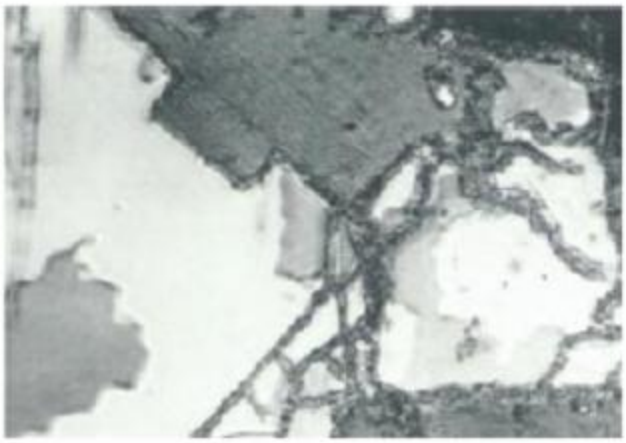

Fig. c: Two grains of quartz in a polished section of granodiorite. In this picture a grain boundary, (approximately down the middle) subgrain boundaries and cracks can be seen.
Frequency: 400MHz