

## ABSTRACT

A distinctive chloritoid-bearing kyanite quartzite occurs at Hagers Mountain, North Carolina, within the Hyco Formation of the Carolina terrane. Apart from the presence of chloritoid, rocks here are similar to occurrences in Virginia, including Willis Mountain (the site of the only active kyanite mine in the United States). Based on geochemical evidence, we interpret the rocks at Hagers Mountain to represent metamorphosed hydrothermally altered Si-rich volcanoclastic rocks. Extent of alteration increases from quartz-sericite schist → chloritoid-sericite quartzite → kyanite-chloritoid quartzite → kyanite quartzite. Kyanite quartzites (without chloritoid) represent the most intensely altered protoliths, an interpretation supported by unusual U-shaped rare earth element patterns (a feature shared with the Virginia occurrences). Evaluation of mass losses indicates slight (~3%) to extensive (~32%) leaching of various elements. Our interpretations of precursor mineralogy in order of increasing degree of alteration are: 1) quartz + sericite; 2) quartz + sericite + chlorite; 3) quartz + kaolinite + chlorite; and 4) quartz + kaolinite. Such mineral assemblages are typical of advanced argillic (high-sulfidation) alteration. Hagers Mountain rocks are similar to other examples of quartz-rich rocks that also contain chloritoid plus an aluminosilicate mineral. Such rocks are commonly associated either with volcanic hosted massive sulfide deposits or epithermal gold deposits, but have in common severe leaching of all mobile constituents in hot, acidic fluids prior to metamorphism.