American Mineralogist, Volume 90, pages 790–800, 2005

U-Pb SHRIMP ages recorded in the coesite-bearing zircon domains of paragneisses in the southwestern Sulu terrane, eastern China: New interpretation

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ABSTRACT

Laser Raman spectroscopy and cathodoluminescence (CL) images reveal that abundant and complicated mineral inclusions occur in zoned zircon separates from paragneisses in drill holes CCSD-PP2, ZK-2304, and CCSD-MH, at Donghai, southwestern Sulu terrane, China. Many low-*P* mineral inclusions are preserved in inherited zircon cores. Coesite + quartz within a single inclusion, and some low-*P* minerals (e.g., quartz and albite) are identified in zircon mantles. Textures showing the quartz to coesite transformation in zircon indicate that both core and mantle of the zircon are detrital. Inclusions of coesite, together with garnet, jadeite, and phengite, are common in zircon rims formed during ultrahigh-pressure (UHP) metamorphism. SHRIMP U-Pb analyses of these zoned zircon grains identify three discrete and meaningful age groups. Proterozoic ages of 840 to 658 Ma for zircon cores indicate that the detrital zircons have a variety of sources. An early Paleozoic group of 505 to 455 Ma ages for zircon mantles constrain neither the timing of a discrete UHP metamorphic event, nor the transformation age from quartz to coesite. The 227 ± 9 Ma (the weighted mean age) obtained from coesite-bearing zircon rims represents the UHP metamorphic age. Thus, one Late Triassic UHP metamorphic event, rather than two UHP metamorphic events, is well established in Sulu UHP terrane by the method of U-Pb SHRIMP dating for coesite-bearing zircon rims in garnet-biotite-amphibole-albite gneisses.