prospecting for radioactive ore deposits was conducted during the 1950's, which resulted in the discovery of a number of thorium and uranium anomalies. A thorium mill was constructed during the 1950's by the New Mexico Thorium Company, but no ore was ever processed. At present, only veins containing mineral specimens are being developed in the Capitan Mountains. The alaskite hosting the mineralized veins can be classified chemically as an alkali granite according to de la Roche et al. (1980). It exhibits the following chemical composition: SiO_2 70–75%, TiO_2 0.1–0.2%, Al_2O_3 13–14%, Fe_2O_3 1.5–1.9%, MgO 0.2–0.3%, CaO <0.5%, Na_2O <5%. The mineralized zones occur as fillings in brecciated veins and as joint or fracture fillings in the alaskite. The mineralogy of the quartz veins is of two types. The first type is quartz veins with REE, characteristic of the Mina Tiro Estrella (MTE) quartz prospect. The minerals consist of quartz, allanite, titanite, adularia, chlorite, and clay minerals. Quartz occurs as massive, somewhat transparent, vein-filling material; as clear, single crystals as large as 3 cm filling open spaces; as the famous, clear to smoky, Japanese Law twinned crystals, averaging 1–2 cm. Allanite, host mineral for REE, occurs as black tabular crystals as large as 3 cm, averaging 5 mm. Titanite crystals are reddish brown, wedge shaped, and range from less than 1 mm to 1 cm. Adularia is pink to white and commonly occurs as massive intergrowths with quartz. Chlorite has been observed as needle-like inclusions within single quartz crystals and as part of the clay gangue. Clay minerals are present within the vein material and may be related to the alteration of the feldspars. The second type is thorium–uranium–REE quartz veins, characteristic of most of the vein occurrences in the Capitan Mountains. The minerals consist of quartz, fluorite, adularia, hematite, calcite, titanite, magnetite, allanite(?), and thorite(?). Quartz ranges from smoky to clear and occurs as massive, vein-filling material and as euhedral crystals filling open spaces. Fluorite occurs as subhedral to euhedral, colorless to yellow to purple cubes, as long as 1 cm. Hematite occurs as cements and coatings on brecciated vein material. Adularia generally forms small, pink euhedral crystals. Calcite occurs as small veinlets in brecciated vein material. Most of the mineralized zones appear to be the result of cracking of the stock during cooling, followed by injection of the mineralizing fluids into fractures and brecciated zones. The unique feature of quartz from the Capitan Mountains is their abundance of fluid inclusions, from which we can tell a great deal about the mineralizing fluids. The quartz from the MTE quartz prospect is an excellent example. The inclusions, ranging from less than 1 micron to 40 microns long, consist of a multi-phase system composed of 5 to 20% vapor, 20 to 30% liquid, and 50 to 70% solids (daughter minerals). The daughter minerals consist of halite, sylvite, hematite, titanite, and possibly Ca–Fe–Mg chloride salts, anhydrite, barite, and other unidentifiable minerals. From optical microscopy and fluid-inclusion microthermometry of 80 inclusions, the MTE quartz vein possibly was derived from fluids that: 1) were of high temperature, vapor homogenization, and halite-dissolution temperatures averaging 550 to 600°C; 2) were of high salinity, to 72 eq. wt% NaCl; 3) were of high densities, approximately 1.3 to 1.5 g/cm^3; 4) were complex, with the inclusion fluid containing between 6 to 15 daughter minerals; 5) were emplaced at pressures of 0.4 kbar and depths of 1.5 km; and 6) exhibited a single fluid population that showed a simple cooling trend. Stable isotope data from the inclusion fluid and quartz of the MTE vein has δD values from inclusion fluid of −56‰ to −58‰ and $\delta^{18}O$ values from quartz of 8.6‰ to 8.9‰, corresponding to water values of 7.6‰ to 7.9‰. Field relationships and petrographic and geochemical data suggest that the mineralizing fluids are of magmatic origin and were derived from the alaskite stock that hosts the MTE quartz vein. Future work will concentrate on other veins in the Capitan Mountains to determine their fluid origin.

References

Allen, M. S., 1988, The Capitan pluton, New Mexico—an example of a zoned granitic magma chamber (abs.): Geological Society of America, Abstracts with Program, v. 20, no. 7, p. A313.

Chapin, C. E., Chamberlin, R. M., Osburn, G. R., White, D. W., and Sanford, A. R., 1978, Exploration framework of the Socorro geothermal area, New Mexico: New Mexico Geological Society, Special Publication no. 7, pp. 114–129.

de la Roche, H., Leterrier, J., Grandclaude, P., and Marchal, M., 1980, A classification of volcanic and plutonic rocks using R_1R_2-diagram and major-element analysis—its relationships with current nomenclature: Chemical Geology, v. 29, pp. 183–210. □

NOTICE—NEW DATE

Due to scheduling difficulties, the Eleventh Annual New Mexico Mineral Symposium will be held on November 10 and 11, 1990 instead of November 17 and 18 as previously advertised. The informal tailgating session will be held at the El Camino Motel on Friday, November 9. The coordinators of the symposium apologize for any inconvenience this change of date may cause and hope it will not interfere with plans for attendance. For more information on the symposium, call Marc Wilson, (505) 835–5246 or Judy Vaiza, (505) 835–5302.

NMBMMR Mineral Museum Notes

The New Mexico Bureau of Mines and Mineral Resources Mineral Museum is pleased to announce the recent acquisition of a fine collection of mineral specimens donated by Anita N. Martin in memory of her husband Andrew J. Martin. Andrew worked for the U.S. Bureau of Mines from 1924 through 1958 in Denver, Colorado, in the Tri-State district centered on Joplin, Missouri, and in Arlington, Virginia. His collection contains many superb display specimens of calcite, sphalerite, and galena from the Tri-State district as well as gold from Colorado and New Mexico, silver from Colorado, copper and silver from Michigan, and ore samples from many U.S. localities.

Other recent display acquisitions include a collection of 11 smithsonite samples from the Kelly mine, Magdalena, New Mexico; a superb linarite crystal, 3.3 cm tall, on a matrix of malachite pseudomorphs of linarite from the Blanchard claims, Bingham, New Mexico; and a sheet of native copper, 37 cm × 24 cm, encrusted with cuprite crystals to 1 cm, from the Chino mine, Santa Rita, New Mexico, donated by Ruth Andrews in memory of Tom Lottriz.

These and other newly acquired specimens are on display at the museum from 8 am to 5 pm on weekdays and on weekends and holidays by appointment with the Bureau's Mineralogist and Curator, Marc L. Wilson, (505) 835–5246.