LETTERS

UNUSUAL NEW ALMANDINE GARNETS FROM BRAZIL

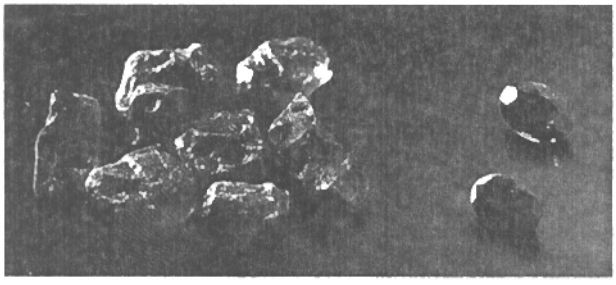
At our laboratory in São Paulo, Brazil, we recently received 11 samples of a "burgundy"-color gem material, including one faceted stone (figure 1). Our source suspected that the isometric material was either spinel or garnet (probably pyrope almandine), and reported that it came from an alluvial deposit in the new state of Tocantins, in the northern part of the country.

Our initial examination revealed an R.I. over the limits of the standard gemological refractometer, which eliminated spinel. Hydrostatic determination of specific gravity yielded values between 3.95 and 3.97, which exceed those of pyrope (3.58 to 3.61). At this point, almandine seemed the likely candidate, but a hardness test using quartz and topaz points revealed a Mohs hardness of almost 8, which is greater than the highest value we could find reported in the literature for garnet (7.5).

X-ray powder diffraction analysis confirmed the cubic crystalline structure and revealed a lattice parameter of A_o = 11.508, which is less than that of almandine (11.530). Qualitative chemical analysis by energy dispersive X-ray fluorescence indicated the presence of (in order of decreasing concentration) Si, Al, Fe, Ca, Mn, and Mg, with traces of Cu and Zn.

To obtain a quantitative chemical composition, we performed neutron activation analysis on four samples. We irradiated 20 mg of material in a nuclear reactor for one minute and an additional 100 mg for eight hours. Gamma-ray emission from the decay of the resulting radioisotopes was measured over periods of time varying from two minutes to 25 days. The weight breakdown obtained includes 22% Fe and 1% Mn; Co, Sc, and Zn showed trace values between 11 and 133 ppm, and Cr between 20 and 40 ppm. The precise determination of Ca could not be obtained due to interference from adjacent energy peaks generated by Fe, Sc, and Mn in the lattice.

Figure 1. These garnets, reportedly from the Brazilian state of Tocantins, revealed some unusual gemological characteristics but were found to be primarily almandine in composition. Photo by Ivan Leão Sayeg Filho.



The optical absorption spectrum obtained from this material includes peaks at 692, 574, 503, 460, 422, 398, and 365 nm, and differs only slightly from that reported for almandine.

We concluded that the samples are a member of the almandine-spessartine continuous series and consist primarily of almandine. The Ca and Mg components are probably responsible for the anomalous characteristics observed, most notably the high hardness. We hope this information will help *Gems & Gemology* readers with their identification of other samples from this highly varied gem group, as well as inform them of yet another new gem garnet locality.

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MORE ON DISCLOSURE

Irradiate, burn, oil, coat, diffuse, paint, fill, or dye it. Enhancing gemstones to improve or alter their appearance is a common trade practice. Yet while discovery that a ruby has been heat treated may not surprise a gemologist, the consumer who purchased the ruby might not have so passive a reaction.

As a paralegal and a gemologist, I agree with your editorial titled "Stability Disclosure: Are We Going Far Enough?" (Summer 1993, p. 79). It is time we end our professional myopic view of what is fair for the ultimate consumer and look at our actions from their perspective.

However, there was an error in the editorial. You stated that the Federal Trade Commission has addressed the issue of enhancement. The quotation was instead from the Jewelers Vigilance Committee's proposed changes to the FTC guidelines, and has not yet been adopted by the FTC. Booklets distributed by the FTC to jewelers do include a note that "considered to be inhibited" by the guidelines are: "The sale, or offering for sale, of any diamond or other natural precious or semi-precious stone which has been artificially colored or tinted ... without disclosure that such artificial coloring or tinting is not permanent if such is the fact." Nevertheless,

Continued on p. 305