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A signature for nephrite jade using its strontium isotopic composition: some Pacific Rim examples
By Dr Christopher J. Adams and Russell J. Beck FGA. **pp 153-62**

Geochronological and radiogenic isotope studies of nephrite jade are reviewed, with particular reference to its paragenesis and as an aid to identifying and characterizing various sources around the Pacific Rim. Detailed studies of nephrites within several 'fields' in New Zealand, which fall within distinct geological terranes and within metamorphic belts of differing ages, clearly demonstrate the inheritance of nephrite strontium isotope compositions from their host rocks during metamorphism and metasomatism. The applications and interpretations developed from this approach are also shown to hold for preliminary analyses of nephrite in other localities around the Pacific Rim, in New Caledonia, Australia, Taiwan, Russia and Canada.

Jaspilite — the gemstone of Ukraine.
By P. Baranov, S. Shevchenko, W. Heflik, L. Natkaniec-Nowak and M. Dumanska-Slowik. pp 163-69

The Ukrainian jaspilites, occurring within Proterozoic sediments of the Krivoy Rog Basin, are an important raw material used in the national metallurgical industry. Some exhibit significant diversity of texture and colour and are suitable as decorative rocks. In a few, the reflective optical effects described as 'tiger's-eye' and 'falcon's-eye' are present. Quartz and iron-ore minerals (hematite, magnetite, goethite) are the main rock-forming minerals of the jaspilites, and carbonates (siderite, ankerite), amphiboles (cummingtonite, grünerite), feldspars and apatite are subordinate phases. In Ukraine, the decorative types of jaspilite are valuable for making fancy goods such as vases and clocks, artistic jewellery, and for the production of facing stone used especially for indoor design.

Ruby and sapphire from Marosely, Madagascar.
By Laurent E. Cartier. pp 171-79

The Marosely corundum deposit is eluvial and follows in a long line of corundum localities discovered in recent years in Madagascar. Colours range from red to blue, and stones are typically zoned, being purple overall. Thirty-five rough corundum samples of 0.1–2.0 ct in weight were selected for study, and the main aspects of this work focused on spectroscopic and chemical properties of the stones. FTIR spectra show the presence of 3160 cm^{-1} and 3309 cm^{-1} peaks in natural untreated corundums, and the relevance of these to the detection of heat treatment of corundum is discussed. LA-ICP-MS data concerning chromophores in colour-zoned samples are consistent with spectral data. Results for ultra-trace element concentrations proved less revealing, emphasizing the need for a combinatory approach with other analytical methods in advancing corundum origin determination efforts.

Identification of dyed jadeite using visible reflection spectra.
By Yan Liu, Taijin Lu, Manjun Wang, Hua Chen, Meidong Shen, Jie Ke and Beili Zhang. pp 181-84

Burma jadeites are often dyed to improve their colour. Most dyed jadeites are identifi ed using a microscope or a high resolution digital imaging system. However, when dye-related microscopic features are not clear, their visible refl ection spectra can be used for identifying dyed jadeite rapidly and accurately. This visible spectral method can be used to identify both dyed-only jadeite (C type) and the dyed and impregnated jadeites (B+C type), which may otherwise be diffi cult to distinguish.

Jadeite jade from Myanmar: its texture and gemmological implications.
By Guanghai Shi, Xia Wang, Bingbing Chu and Wenyuan Cui. pp 185-195

Jadeitites, rocks consisting predominantly of jadeite, are the source of the precious stone known as feitsui by the Chinese. Jadeitites vary greatly in transparency, compactness and toughness due to their diverse textures and microstructures. The authors consider these textures in two major groups: (i) primary and (ii) deformed and recrystallized. In the first group, the rocks are coarse-grained with mosaic, granitoid or radial textures and some crystals are chemically zoned; such rocks can be porous. In the second group are jadeitites of finer grain size, generally formed by metamorphism of the coarse-grained jadeitites, with textures showing variable preferred orientation of crystals, mechanical twinning, shear zones, development of sub-grains, serrated high-angle sutured grain boundaries, or a 'foam' pattern. Texture, compactness and colour variation has generated a large number of trade names. The most precious jadeite jades are described as 'icy' or 'glassy', which relates to the quality of their transparency. Studies of jadeite textures have gemmological applications both in identifying and grading rough material and in the design, fashioning and grading of manufactured articles. Geologically, textures provide evidence of the formation and metamorphism of the whole range of Myanma jadeitites and it is probable that these processes are linked to the major Sagaing strike-slip faults.

A description and history of one of the largest nacreous pearls in the world.
By J.C. (Hanco) Zwaan and Herman A. Dommisse. pp 196-202

Abstract: A large pearl, weighing approximately 2385 grains, is described. This pearl is one of the largest nacreous pearls ever found. Although the first known owner, Sir H.C. Sander, left this pearl to be auctioned in Amsterdam in 1778, and the pearl has been part of a Dutch private collection, at least from the nineteenth century onwards, it has never been described before. Its properties indicate a freshwater origin. Supported by an eighteenth century print and historical references, its properties point to the Far East as its most likely provenance. The weight of the pearl is slightly less than the recorded weight of the Pearl of Asia, as described in the literature.
Based on its shape, it had been suggested previously by the present owner that this pearl could actually be the disappeared Arco Valley Pearl, which until recently had been owned by one Italian family since 1700. After the sudden announcement that the Arco Valley Pearl had been put up for auction in Abu Dhabi in 2007, and the recent discovery that the pearl described herein had been sold in Amsterdam in 1778, the suggested Italian link could be refuted and a strong Dutch link confirmed.

Geographic typing of gem corundum: a test case from Australia.
By F. Lin Sutherland and Ahmadjan Abduriyim. pp 203-10

A group of analysed sapphires attributed to the rather broad source region of New South Wales was investigated by comparison of their trace element contents with those of sapphires from known Australian fields. Both groups of sapphires were analysed using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) at the same Japanese laboratory. Blue sapphires from Anakie, Queensland, were included for comparison as these are also sold in New South Wales. Comparisons of Fe, Ti, Mg, Cr, Ga and other trace element contents suggest that the vaguely located group of sapphires came from the Inverell gem field in New England. The results give encouragement for more studies on geographic typing of gem corundum.

Dickite: a gem material for carving from Thailand.
By Seriwat Saminpanya, Chaichart Dharmgrongartama and Namrawee Susawee. pp 211-25

Dickite ($Al_2Si_2O_5(OH)_4$) from Saraburi, Thailand, is a raw material for the ceramics industries. It is also an ornamental gem material and its physical and gemmological properties are reported. In the gem trade, three grades are distinguished: grade A (cream and red with Al_2O_3 ~41 wt% and SiO_2 ~43 wt%), %); grade B (grey); and grade C (dull red) (Al_2O_3 ~15-16 wt% and SiO_2 ~79 wt%). The XRD results indicate that the samples of grades B and C contain quartz. The dickite occurs as cryptocrystalline aggregates and SEM images indicate that these are pseudo-hexagonal plates stacked like books. Even though dickite has a hardness of only 1½–2 on Mohs' scale, it is quite coherent and easily carved.
A survey indicates that carvers prefer the unique colours and textures of grade A samples to produce animal figurines. The rough stones should be chosen with care in order to match the appearance and size of the expected product.

Application of mineralogical methods to the investigation of some gem-quality corals.
By Lucyna Natkaniec-Nowak, Magdalena Dumanska-Słowik, Jerzy Fijał and Anna Krawczyk. pp 226-34

Infrared spectroscopy, microscopy, cathodoluminescence and X-ray analysis have been used to investigate corals from various sources. The red, pink and white corals are composed mainly of magnesian calcite with a poorly ordered structure; a lack of cathodoluminescence indicates that they are rather young. The organic corals consist mainly of biopolymers of collagen type with subordinate magnesian calcite. Their FTIR spectra contain bands attributed to vibrations of OH, H_2O, C-H and N-H in molecules occurring in the protein structures of collagen. Infrared spectra were also used to detect wax or resin treatment of red coral.

Colour-change garnets from Madagascar: variation of chemical, spectroscopic and colorimetric properties
By K. Schmetzer, H.-J. Bernhardt, G. Bosshart and T. Hainschwang. pp 235-82

A detailed account is given of the chemical composition and chromatic characteristics of a suite of 52 faceted colour-change garnets from Bekily, Madagascar. Microprobe results show them to be pyrope-spessartines with minor amounts of uvarovite (Cr) and goldmanite (V). All samples reveal absorption spectra with a dominant maximum in the visible range between 569 and 584 nm, which correlates with the chromium and vanadium contents of the garnets. From these considerations, it is concluded that the ratio spessartine : (goldmanite + uvarovite) is the key feature to understand the colour and colour changes of these samples. Colorimetric parameters for all garnet samples were calculated for daylight and incandescent light for the CIE 1931 chromaticity diagram and for the CIELAB 1976 uniform colour space, which are described in detail and illustrated.
The three effects discussed are colour difference, hue angle difference, and chroma difference. The extent of colour change is described as a function of two fundamental parameters, colour difference and hue angle difference, and correlated with simple categories such as faint, moderate, strong and very strong.

The characteristics of red andesine from the Himalaya Highland, Tibet.
By Ahmadjan Abduriyim. pp 283-98

Natural-coloured Tibetan andesine has been mined using simple hand tools from an alluvial deposit at Bainang County in the Xigazê area of Tibet. The gem-quality andesine is derived from Tertiary–Quaternary volcanogenic sediments related to Jurassic-Cretaceous volcanic rocks. Weathering and alluvial transport have resulted in round detrital crystals, most of which have an orangy-red body colour; a few stones have bicoloured zones of red and green. Top-quality stones in deep red are characterized by fine granular inclusions and some twin lamellae. Poorer qualities of andesine in orange-red and reddish-orange generally contain abundant turbid irregular colour patches, irregular dislocations, tubes and parallel lath-like hollow channels and a few tiny platelets of native copper. EPMA chemical analyses indicate a composition range of $(K_{0.03}Na_{0.46\text{-}0.49})_2Ca_{0.46–0.49}Al_{1.43–1.48}Si_{2.51–2.53}O_8$, the equivalent ratios of albite:anorthite:orthoclase being $Ab_{46.96\text{-}49.79}$:$An_{46.72–49.94}$:$Or_{3.03–3.50}$, which indicates andesine near the andesine-labradorite border. The lattice parameters are a_0=8.161–8.193 Å, b_0=12.849–12.919 Å, c_0=7.105–7.126 Å,

α=93.26°–93.74°, β=116.27°–116.38°, γ=89.93°–90.16°, and the RIs are α=1.550–1.551, β=1.555–1.556, γ=1.560–1.561. LA-ICP-MS analysis indicates the presence of the trace elements; Li, Mg, K, Sc, Ti, Mn, Fe, Cu, Ga, Sr and Ba. An estimate of the degree of structural ordering of Al in tetrahedral sites in Tibetan andesine was made from the X-ray powder diffraction pattern. Both Δ and γ values are plotted as a function of mole percent anorthite (An), and indicate that Tibetan andesine has a low degree of Al/Si ordering with only 22–29 percent of Al lying in the tetrahedral T1(o) site; this indicates that it formed at about 800°C in a volcanic environment. By plotting Ba/Sr versus Ba/Li ratios Tibetan red andesine can be differentiated from andesines of Inner Mongolia.