

SI Text

Criteria to identify Fengtian (Taiwan) nephrite jades. Iizuka and Hung (1) report a comparative mineralogical study of nephrite deposits by WDS-EPMA, including Fengtian (Taiwan) and others from East Asia and the circum-Pacific region. They propose that Fengtian nephrite can be discriminated from the other sources on the following criteria:

1. The Fengtian nephrites are mostly green in color (but occasionally vary from white to grey), with a fibrous texture;
2. The Fengtian nephrites are tremolite-actinolite. Although the Mg# ($\text{Mg}/[\text{Mg}+\text{Fe}^{2+}]$ ratio) is fairly wide, Mg# is under 0.93 in any color (the median is 0.9: see Fig. 3 A). Most tremolitic or white-colored nephrites (including most nephrites from China, Philippines and Vietnam) have Mg# >0.94, and therefore do not meet this criterion;
3. Black-colored chromite is the most common accessory mineral in Fengtian nephrite. So far, nephrites from Taiwan (Fengtian), South Island in New Zealand, Gansu in northwestern China, and Siberia in Russia also meet this criterion, but contain lesser amounts of zinc;
4. The chromite in Fengtian nephrite bears significant amounts of zinc (2 to 11 wt % for ZnO: see Fig. 3 F) and manganese (3 to 10 wt % for MnO). Nephrites which contain less Zn and Mn in their chromite inclusions do not meet this criterion, and include those from New Zealand, Gansu and Siberia.

Noninvasive analysis by LVSEM-EDS. Before SEM observation, the studied artifacts were well cleaned with distilled water for several hours in an ultrasonic bath to remove dust and soil from their surfaces. Each was then rinsed in ethanol, and dried in an oven overnight at 75°C. A scanning electron microscope (SEM: JEOL JSM-6360LV) equipped with an energy dispersive X-ray spectrometer (EDS: Oxford Instruments, INCA-300) was used with 15kV in acceleration voltage and 0.18nA in the primary electron beam current under low-vacuum conditions (25 Pascal). The analyzed points were selected on the relatively flat and well polished surfaces of each

earring. Minerals were identified based on comparisons of the x-ray spectra with those of chemically-known minerals (2). Chemical compositions of elements present in amounts > 1% by weight, in both the nephrite matrix and mineral inclusions, were analyzed with a 1- μ m electron beam spot for 100 seconds. All Fe is calculated as ferrous iron (Fe^{2+}) because ferric iron (Fe^{3+}) is negligible to rare in nephrite (3).

1. Iizuka Y, Hung HC (2005) *J Austronesian Studies* 1:35-79.
2. Iizuka Y, Bellwood P, Hung HC, Dizon E (2005) *J Austronesian Studies* 1:83-108.
3. Tan LP, Lee CMW, Tien PL (1978) *Taiwan National Council special Pub.* 1,1-28.