

# LMHC Information Sheet # 11

## Jade and related Materials

- Definitions
- Suggested Testing Procedures
- Report wording

Members of the Laboratory Manual Harmonisation Committee (LMHC) have standardised the nomenclature that they use to describe nephrite jade, jadeite jade, omphacite jade, and kosmochlor jade.

### Definitions

**Jade** is a trade name that encompasses aggregates of fibrous or granular crystals primarily composed of jadeite, omphacite, kosmochlor, or nephrite.

**Nephrite** is a rock mostly consisting of densely interlocked micro- to cryptocrystalline fibres of the actinolite-tremolite solid solution series (amphibole group). The ideal chemical formula is  $\text{Ca}_2(\text{Mg,Fe})_5\text{Si}_8\text{O}_{22}(\text{OH})_2$ . Gem-quality nephrite displays colours commonly ranging from white to deep green, but can also be brown or black, and is known as nephrite jade.

**Jadeite** is a pyroxene mineral and forms solid solutions with other pyroxene members such as augite and diopside, aegirine, omphacite and kosmochlor. Gem quality 'jadeite jade' is not a single crystal but a rock consisting of aggregated fibrous or granular crystals of jadeite and may contain small amounts of various other minerals. Its colour commonly ranges from white through pale green to deep green but can also be blue-green, dark green to black, and other rare colours of pink, lavender varieties. Mineralogically, the ideal chemical formula of jadeite is  $\text{NaAlSi}_2\text{O}_6$ .

**Omphacite** is a member of the pyroxene group with the chemical formula  $(\text{Na, Ca})(\text{Al, Mg, Fe})\text{Si}_2\text{O}_6$  and is commonly present not as a single crystal but as an aggregate (rock). Gem-quality omphacite displays a pale green, deep green, black or nearly colourless colour and may be called omphacite jade.

**Kosmochlor** is a green chromium and sodium rich pyroxene with the ideal chemical formula  $\text{NaCrSi}_2\text{O}_6$ , and is commonly present not as a single crystal but as an aggregate (rock). Gem-quality kosmochlor displays a dark green to nearly black colour and may be called kosmochlor jade.

**Pyroxenes** have a solid solution reaction and each coexists or aggregates to make up a rock. See figure 1.

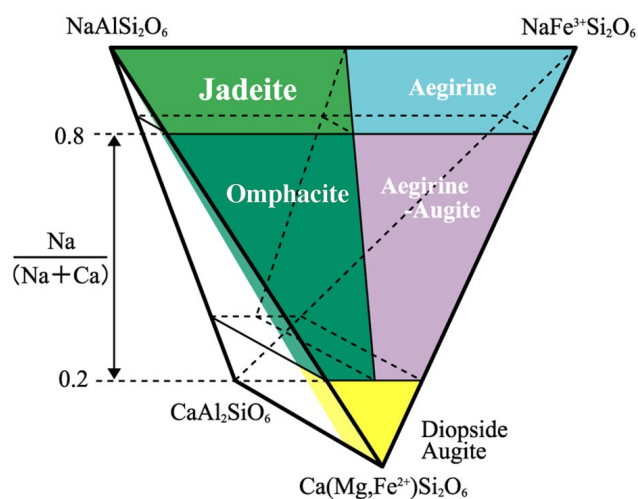
**Fei Cui** (翡翠) is a historic Chinese name (pronounced *fay choy*) for a structurally tough ornamental aggregate composed solely or principally of any of the following or any combination of the following jadeite, omphacite, and kosmochlor, forming jadeite jade, omphacite jade or kosmochlor jade, and potentially a small amount of other minerals.

### Suggested Testing Procedure

The complexity of jade and its related materials is related to the fact that they are aggregates (rocks) which may contain several mineral phases. For a correct identification, it is suggested to take into account:

- The visual aspect of the stone (e.g. colour homogeneity, texture)
- Classic gemmological testing (e.g. refractive index, specific gravity)
- Chemical analyses
- Absorption spectroscopy (UV-Vis-NIR)
- Structural analyses (FTIR and Raman spectroscopy)

And optionally, any further established analytical method for geological samples.

**Figure 1. Pyroxene classification by chemical composition****Report wording**

Identification:

Group: **amphibole**  
 Species: **(natural)<sup>1</sup> actinolite-tremolite**  
 Variety: **(colour)<sup>2</sup> nephrite (jade)<sup>1</sup>**

Identification:

Group: **pyroxene**  
 Species: **(natural)<sup>1</sup> (jadeite or omphacite or kosmochlor)<sup>3</sup>**  
 Variety: **(colour)<sup>1</sup> (jadeite jade<sup>1</sup> or omphacite jade or kosmochlor jade)<sup>3</sup>**

Further information:

For jadeite jade, omphacite jade or kosmochlor jade, a comment may be added, such as:  
 (May also be called Fei Cui in the Asian trade)<sup>1</sup>

Any nephrite jade, jadeite jade, omphacite jade and kosmochlor jade that does **not show indications** of having undergone modification through the impregnation with colourless or near colourless<sup>4</sup> wax, resin, or any other agents shall be described as,

**none or (natural colour), no indications of impregnation<sup>5</sup>**  
 for jadeite jade, omphacite jade and kosmochlor jade only: **(known in the trade as 'A-jade')**

Any nephrite jade, jadeite jade, omphacite jade and kosmochlor jade that **shows indications** of having undergone modification through bleaching and the impregnation with colourless or near colourless<sup>4</sup> wax, resin, or any other agents shall be described as,

**(resin/wax)<sup>1</sup> impregnated**  
 for jadeite jade, omphacite jade and kosmochlor jade only: **(known in the trade as 'B-jade')**

Any nephrite jade, jadeite jade, omphacite jade and kosmochlor jade that shows indications of having undergone modification through bleaching and the impregnation with **coloured** resin, or any other coloured agents shall be described as,

**dyed and impregnated**  
 for jadeite jade, omphacite jade and kosmochlor jade only: **(known in the trade as 'B+C-jade')**

Any nephrite jade, jadeite jade, omphacite jade and kosmochlor jade that shows indications of having **fissures/fractures filled with coloured** agents shall be described as,

**Dyed**

for jadeite jade, omphacite jade and kosmochlor jade only: **(known in the trade as ‘C-jade’)**

<sup>1</sup> Wording and text in parantheses is optional.

<sup>2</sup> Optionally insert the colour of the stone being examined particularly if not described elsewhere on the report.

<sup>3</sup> Insert the recognized species name

<sup>4</sup> When viewed in bulk, e.g., in a bottle, oils and resins may appear to have colour. However, when viewed in thin films, as in fissures, the appearance may be near colourless.

<sup>5</sup> The presence of light surface waxing need not be declared.