

Letters to the Editors

Geological field investigation on the reported occurrence of 'red feldspar' in Tibet

Dear Sirs

The existence of a red feldspar (andesine) deposit in Tibet has been a controversial subject since 2008. In view of the upcoming focus on the subject at the Gemstone Industry and Laboratory Conference (GILC) to be held in Tucson on 31 January 2011, we would like to record here the research carried out by the undersigned members of the National Gemstone Testing Center (NGTC), China.

In 2009, we selected 120 stones with surrounding rock features from a warehouse of the Jingxing Company which contains hundreds of kilograms of 'red feldspar' raw material on which we carried out petrological and gemmological research. The main techniques we used were traditional petrological methods, such as detailed thin section observation under polarization microscopy for the fine structures of the surrounding materials, and comparison of the spectroscopic data between the so-called Tibetan red feldspar and feldspar crystals collected from other sources. We found that the adhering materials on the surfaces of the rough red feldspar crystals were mainly glassy, enriched with copper and iron impurities, suggesting that the 'red feldspar' had been subjected to high temperature treatment with colouring elements added. This was reported by three of the undersigned, Yan Lan, Taijin Lu and Weiwei Wang¹.

In order to verify our laboratory results and to investigate the reported red feldspar deposit in Tibet (Abduriyim, 2009²), the NGTC team undertook a field investigation in Tibet between 26 May and 1 June 2010, with the support of two jewellery companies.

Our team consisted of nine members. These were NGTC: Taijin Lu, Yan Lan, Chun Chen, Zhongming Chen, Qi Li, Jun Xie; Dr. Wan Jiang (Chinese Academy of Geological Sciences, geologist); Ying Wang (TTF); Hechuan Zhang (Zhanfan) accompanied by Liping Lou, the wife of miner Tong Li. We arrived at Shigatse (Xigaze), Tibet, on 28 May. In Lhasa and Xigaze, we interviewed about 60 persons including 30 jewellery buyers, asking them about the occurrence and the existence of red feldspar. We also visited the Sixth Geological Team, Tibet Autonomous Region, located near Lhasa city, responsible for geological work on Tibetan gem materials. On 29 May, we carried out field work and sampling in the villages Mencuo and Zhalin (29° 04' 01.5" N, 89° 20' 54.8" E) located at the border area of BaiLang (BaiNang) county and Jiangze (Gyangzê) county in Shigatse Prefecture, Tibet.

In the purported mining area, our team divided into three groups: one for the geological survey and analysis, one for digging and another for interviewing and recording activities. We dug at three sites, and spent more than eight hours on site. We interviewed chiefs,

villagers and mine workers from Mencuo and Zhalin villages. It is important to note that despite multiple requests for geological survey and sampling in the so-called 'native deposit' as reported by others (such as Ahmadjan, 2009²), we were not able to visit that site. We left Shigatse on 30 May and returned to Shenzhen on 1 June.

Two investigation team members (Wan Jiang and Hechuan Zhang) performed a second period of field work during August 2010. They investigated two sites: D465 (29° 02' 42.5" N; 89° 22' 10.9" E, 4049 m) and D466 (29° 02' 33.9" N; 89° 22' 10.1" E, 4072 m). They failed to find any red feldspar in primary rock, but did pick up one sample on the ground at site D466.

The major results and observations are:

- We didn't dig out any 'red feldspar' crystals from solid sedimentary rocks in either of the two sites.
- All the red feldspar samples we found were dug out or picked up from either loose soils (21 samples) or from the surfaces of alluvial fan slopes (142 samples). Nine samples were collected from a miner's bag and 15 samples were purchased from a 'digging worker' in the field, who said that 14 of the samples he sold were treated. In addition, 11 rock samples, such as diabase, slate, phyllite and basalt, were collected in the field. They are major rocks in the alluvial fan.
- All the red feldspar samples we collected as well as the ones we saw in the villagers' bags displayed rounded morphology without any sharp edges and corners. The surfaces are etched or dissolved with numbers of small pits filled with white powder.
- The white powder on the surfaces of the stones can easily be cleaned off. It is difficult to accept that the white powder could have survived the abrasion during geological transport which would be expected for minerals in an alluvial deposit.
- The 'red feldspar' samples picked up from different places in the alluvial fan are of similar sizes, ranging from 5–10 mm in length. Other minerals typically display size distribution (i.e. geological sorting in size) from the top to bottom of the valley but there was no evidence of this size range in the feldspars. In other words, the size distribution of the 'red feldspar' was not consistent with normal alluvial sorting of mineral grains.
- The density and distribution of the 'red feldspar' crystals on the surface and within loose soils vary significantly. We picked up 21 red feldspar samples within one square metre.
- In Lhasa and Shigatse none of the people interviewed knew of the occurrence and existence of the red feldspar in Tibet. They all stated that they had neither seen nor heard of red feldspar found in Tibet.

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- Geologically, the east and west of the valley we visited are mountain summits where the bedrocks (T_{3n3}) are exposed (relative height: 200~400 m or so). The valley from south to north was formed by turbulent floodwaters. The alluvial fan is a secondary river terrace, comprising mainly black-grey silty slate, phyllite, diabase and basalt. The fragment sizes of the rocks on the surface range from 1–10 cm, depending on the position in the valley.

Based on our investigations, we find it hard to believe that there are gem grade feldspar deposits in the BaiLang and Jiangze areas of Tibet. In our opinion, the red feldspar samples that we collected and recovered from the supposed mining areas during our field investigations were deliberately planted on the ground surface and within loose surface soil. However, limited access to the investigated area means that the field investigation performed by our whole team lasted only one day. The second opportunity for fieldwork by just part of the team lasted two days. Since the local geology could in theory allow for the presence of feldspar, we suggest that the relevant Government Department undertakes a more detailed investigation as soon as possible.

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**On behalf of the NGTC feldspar investigation team:
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