1. Fragment of fissure wall with faden **quartz**

2. Faden quartz. 6 cm tall. Waziristan, FATA,

Toyee, South Waziristan, FATA, Pakistan.

Pakistan.

and crystals of **quartz** and **calcite**. 14 cm wide.

Specimens and photos:

if other is not specified.

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FADEN CRYSTALS: ACTIVE FADEN

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Faden crystals, odd crystals of quartz and some other minerals with a mysterious white strip inside them, have been drawing researchers' and amateurs' attention for long time. Placed beside a "normal" crystal they look an amassment of imperfectness. And, like in the case of other natural imperfectness, a paradoxical examples of elegance and beauty.

The genesis of faden crystals was a subject of exhaustive study since the second half of the 19th century; today the problem may be considered to have been solved in the main. However, some minor properties of faden crystals excite keen interest as they imply the white strip's active role in the process of faden crystal growth.

aden crystals are peculiar crystals grown on specific crystal seeds in the so called *"Alpine type veins"* and are confined to induced hydraulic fractures in metamorphic rocks. In general, the origin of faden crystals has been described by the author earlier (Kantor, 2013). The availability of faden as well as the collective occurrence and some morphological similarity suggest, too, some common features of genesis for the faden crystals of various *"Alpine vein"* minerals such as quartz (*Figs.* 1 and 2), epidote (*Fig.* 3), brookite (*Fig.* 4), clinozoisite (*Figs.* 5 and 6), etc.

Faden crystals are often mentioned in the mineralogical literature; however, the studies of their genesis are few in number and deal with quartz only. Of course







3. Faden **epidote**. 3.5 cm. Alchuri, Shigar Valley, Skardu District, Gilgit-Baltistan, Pakistan.

4. Faden **brookite**. 4 cm. Zard Mt., Raskoh Mts., Kharan, Balochistan, Pakistan.

5. Faden **clinozoisite**. 5.5 cm. Alchuri, Shigar Valley, Skardu District, Gilgit-Baltistan, Pakistan.

6. Faden **clinozoisite**. 3 cm. Alchuri, Shigar Valley, Skardu District, Gilgit-Baltistan, Pakistan.





quartz is the best subject of investigation thanks to its relative abundance and the transparency of its specimens.

The hypothesis of their origin by G.G. Laemmlein is currently accepted (Laemmlein, 1946, 1973). According to Laemmlein, fadens are generated by the continuous crystallization of quartz under conditions of discrete, intermittent opening of a fissure. As the fissure was opening a quartz aggregate was growing on the quartz grains exposed in the fissure and spanned the latter from one its wall to another. The columns of this aggregate were being torn at every opening pulse; at the start, however, the pauses were long enough to let the fractures heal. Tiny liquid inclusions captured during healing made the columns seem milky white. These