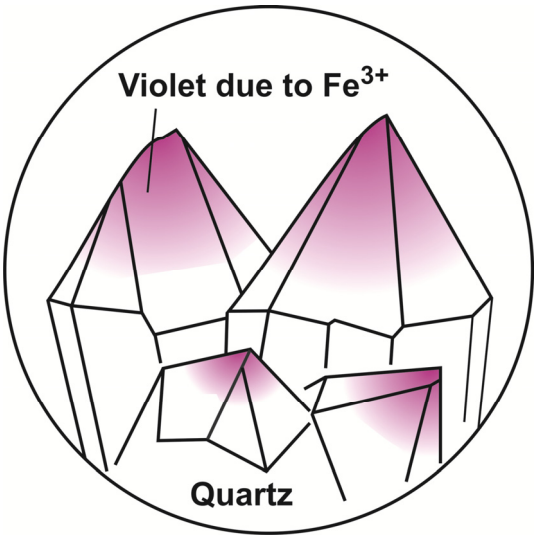
Unevenly Colored Crystals as an Example of an Extremely Small Diffusion Velocity



Equipment:

lamp or projection table

“Chemicals”:

unevenly colored amethysts
(e.g. from the Brazilian mountains,
approx. several hundred million years old)

Safety:

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Procedure and Observation:

The amethysts are illuminated or projected in such a way that the uneven violet coloring is clearly visible; the best result is achieved by using cut plates. The amethysts can also be passed around.

Explanation:

Amethysts, a violet variety of the mineral quartz, often show an uneven violet coloring even after many millions of years, caused by diffusing Fe^{3+} ions. Despite the enormous age, an even distribution has not been achieved, as would be expected thermodynamically. The color itself is due to Fe^{4+} ions, which are formed from the Fe^{3+} ions by irradiation (e.g. with naturally occurring radioactive isotopes).

Photo: planete-cristal.net

Disposal:

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