

## TEMPERATURE-TIME BLEACHING REACTION IN SMOKY QUARTZ: NATURE AND EXPERIMENT

KARFUNKEL, J., ADDAD, J., PINHEIRO, M., KRANBROCK, K., LAMEIRAS, F., BANKO, A., HADRIAN, W. UFMG, Belo Horizonte, Brazil.

Smoky quartz can be decolorized by heat. The color is stable below 225°C and 180°C for natural smoky and for smoky color produced by irradiation, respectively. We measured the absorption spectra of both, and based on EPR studies attributed it to a probable charge transfer process involving a hole bound to an oxygen ion nearby a substitutional  $\text{Al}^{3+}$  for  $\text{Si}^{4+}$ . The temperature-time curve is not a linear curve. Moreover the curve is asymptotic to the time axis near 220°C, but to the temperature axis too, at very fast heating. We experimented shock heating of natural smoky-brownish quartz by electrical discharge in high voltage laboratories, yielding temperatures in excess of 570°C, evidenced by the planar cleavage fractures of the formed b-quartz in a reversible process. No bleaching took place. Very dark natural smoky quartz from colluvial layers struck by atmospheric discharges during the last 10 kyr BP, show similar planar cleavage fractures, corroborating the laboratory experiments. We can conclude that the bleaching process of smoky quartz and furthermore its inertia to shock temperatures beyond the bleaching point deserve more careful scrutiny.