



## **Widening power of low-field magnetic methods in the investigation of rocks and environmental materials using Multi-Function Kappabridge Set**

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The investigation of rocks and environmental materials in low magnetic fields may be a good and relatively inexpensive alternative of high-field techniques.

The Multi-Function Kappabridge Set measures the "in phase" susceptibility, the relative changes of the "out of phase" susceptibility and the phase angle in variable magnetic fields, at three operating frequencies, and at variable temperatures. The frequencies are 976 Hz, 3,904 Hz and 15,616 Hz. The field ranges are: 2 to 720 A/m at 976 Hz, 2 to 360 A/m at 3,904 Hz and 2 to 220 A/m at 15,616 Hz. The temperature range is from -192 deg C to 700 (exceptionally 800) deg C. In addition, the anisotropy of magnetic susceptibility (AMS) can be measured at room temperature in variable fields and at three frequencies.

In multidomain titanomagnetite, the field variations of both "in phase" susceptibility and phase angle increase with increasing Ti component (indicated by Curie temperatures). The susceptibilities of most titanomagnetites lie within the Rayleigh Law range.

Pure magnetite shows very low or no field variation of susceptibility and virtually zero phase angle. While multidomain magnetite shows no or very low frequency variation of susceptibility, nanoparticle magnetite shows remarkable frequency variation.

Environmental samples were investigated coming from selected dams and ponds in Czech republic. The purpose was to indicate possible anthropogenic pollutions. Some unusual specimens were found showing weakly decreasing susceptibility with field.

The orientations of principal susceptibilities are virtually field and frequency independent, while the degree of AMS can be dependent.