SUPPLEMENTORY RESOURCES

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High-Temperature phase transitions in Serpentine

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The study of mineral reactions as a function of temperature and time gives an insight into its kinetics. In this work we try to establish a temperature-time (T-t) phase diagram for serpentine using XRD. Time-temperature kinetic studies are needed for industrial applications especially for chrysotile which needs to be dehydroxylated into less harmful products before discarding into the environment. The Temperature-time (*T-t*) diagram shows that serpentine dehydroxylation and forsterite/enstatite formation depends on temperature, duration of heating rather than on temperature alone. This can have lot of implications in understanding natural, open serpentine systems where a lot of factors play a role like temperature, residence time, chemistry of the circulating fluids and impurities in the natural serpentinites. In carbonaceous chondrite samples which have undergone thermal heating, we need T-t graphs to understand the peak thermal metamorphic degrees, peak temperatures and kinetics of the serpentine reactions.

References :

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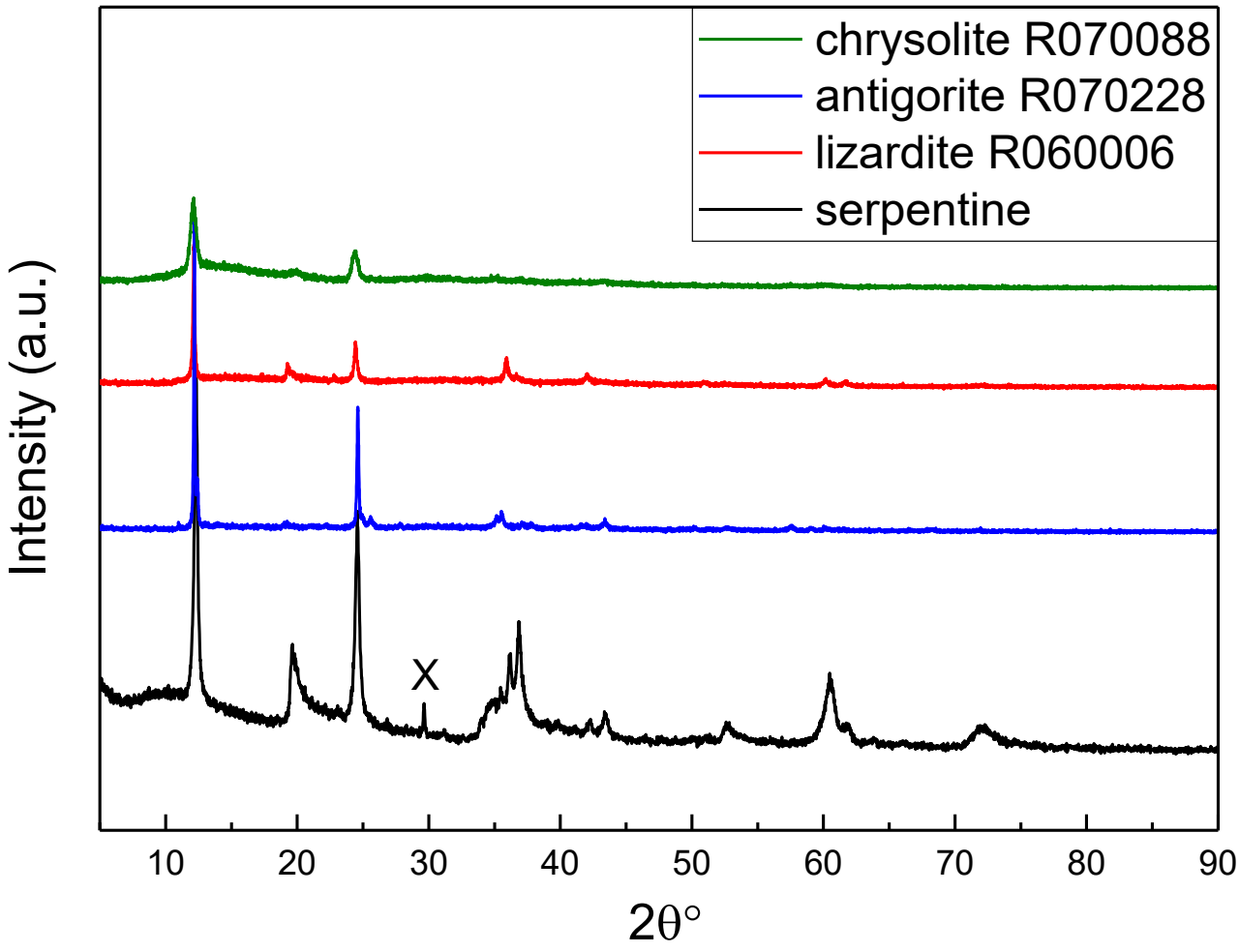

Fig 1: Serpentine sample verified using RRUFF Database. The peak marked X is an impurity in the sample most probably a pyroxene/calcite.

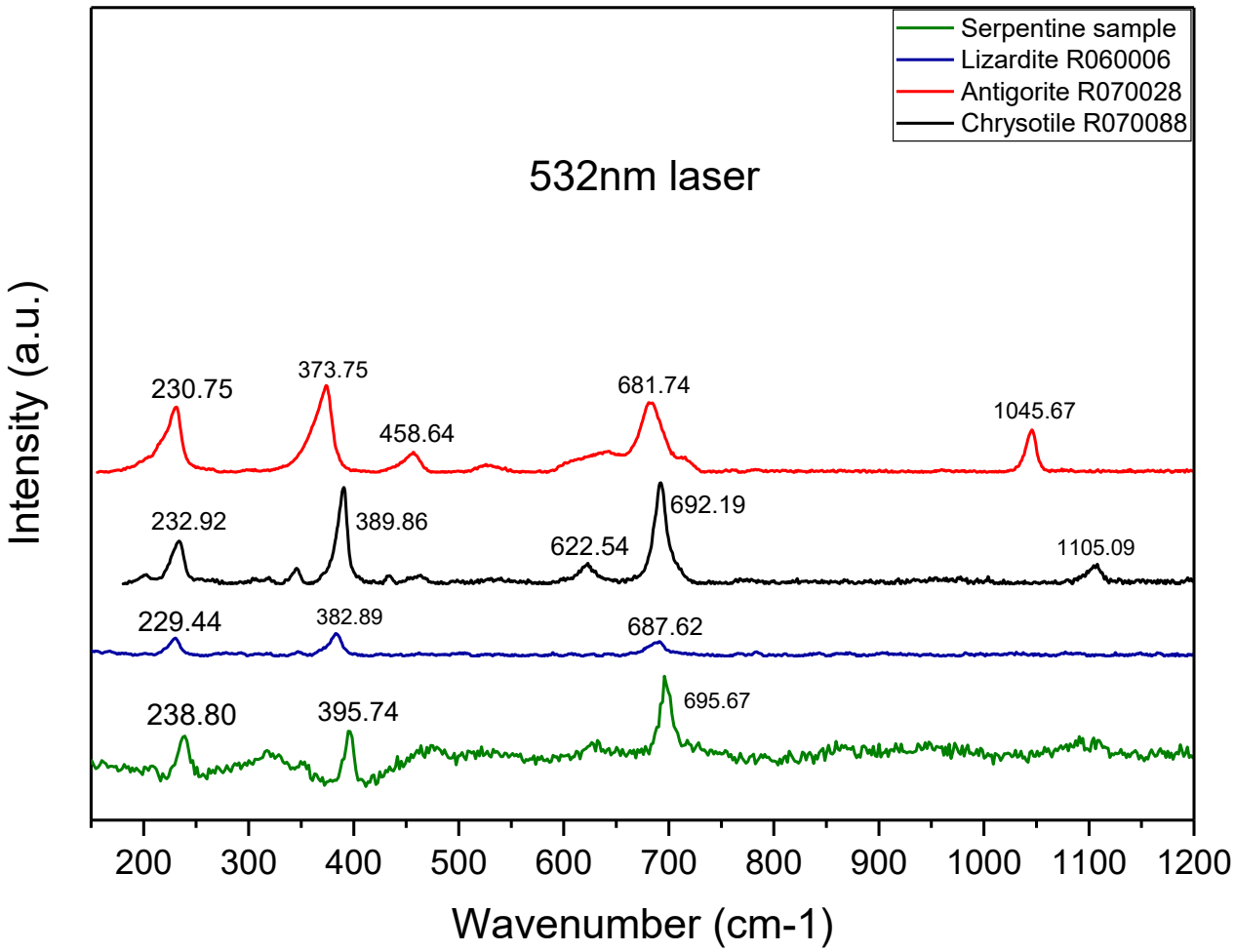

Fig 2: Raman spectrum done to understand the variety of serpentine and verified using RRUFF database. It matches with lizardite and chrysotile. The sample should be a combination of lizardite and chrysotile hence we refer it to as serpentine instead of specifying the variety.