A Tale of Two Halloysites

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Even though the mineral halloysite belongs to the kaolin subgroup of minerals (kaolinite, dickite, nacrite, halloysite), and that most aspects of formation, structure, etc, of its siblings in this subgroup, are very well described and well understood, many aspects of halloysite remain poorly understood and enigmatic. How does it form? Why does it roll? Why does it contain H_2O molecules between the 1:1 kaolin layers? Are just some of the questions to which we still do not have the complete answers. In 1826 when Pierre Berthier first reported on analyses of a white clay from Angleur, Liège, for which he proposed the name 'halloysite' (after the Belgian geologist - Jean Baptiste Julien d'Omalius d'Halloy) he immediately pointed out, that in powder form, halloysite loses water easily when kept for some time at temperatures near 100°C. He further commented that calcination of so treated samples always liberated less water than the original unheated specimen, which contained a total of 26.5% water. He even went further and commented 'Mais il paraît extrêmement difficile de déterminer avec une parfaite exactitude la portion d'eau qui est en état de combinaison, et celle qui n'est qu'absorbée par attraction capillaire'. With this deceptively simple report, Berthier had defined the problem of the different hydrated and dehydrated states of halloysite, and the issues of working with the hydrated form. These two forms of halloysite, hydrated and dehydrated, have fascinated clay mineralogists ever since. This talk will follow the tale of these two forms of halloysite and detail some of their associated characteristics along with the continuing adventure of their study at the present time.

References – PDF-5+ patterns 00-058-2031, 00-060-1517, 00-060-0342.