

## **Radiocarbon dating of soot aggregates – speleothems black layers example**

H. HERCMAN<sup>1\*</sup> AND M. PAWLYTA<sup>2</sup>

<sup>1</sup>Institute of Geological Sciences, Polish Academy of Sciences,  
Twarda 51/55, 00-818 Warszawa, Poland  
(\*correspondence: hhercman@twarda.pan.pl)

<sup>2</sup>Institute of Engineering Materials and Biomaterials, Silesian  
University of Technology, Konarskiego 18A, 44-100  
Gliwice, Poland

The development and improvement of various measurement methods allows the analysis of ever smaller samples with increasing accuracy and sensitivity. It creates new possibilities for structural and chemical characterisation of materials even at nanometric resolution. In addition to these advantages, there are also pitfalls that can be formulated as questions concerning whether the results of nano-sample analyses are characteristic of the original material i.e. layers, rocks or other larger objects. The present study discusses the isotopic analyses (radiocarbon (AMS) dating and stable Carbon isotopic composition) of dark layers occurring within the speleothems found in Domica Cave (Slovakia) and Rečička Pečina Cave (Slovenia). The occurrence of soot aggregates formed by burning fragments of wood was confirmed by high-resolution transmission electron microscopy (HRTEM) studies. Chemical pre-treatment was necessary for sample purification and effective extraction of carbon soot. The radiocarbon age of “clean” soot aggregates was shifted towards younger values compared with the lower-purity samples. Finally, an experiment involving burning of modern wood was performed. The radiocarbon content and Carbon stable isotopic composition in different combustion products was compared and discussed.