



## **On the status of IAEA delta-13C stable isotope reference materials.**

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For practical reasons all isotope measurements are performed on relative scales realized through the use of international, scale-defining primary standards. In fact these standards were materials (artefacts, similar to prototypes of meter and kg) selected based on their properties. The VPDB delta-13C scale is realised via two highest-level reference materials NBS19 and LSVEC, the first defining the scale and the second aimed to normalise lab-to-lab calibrations. These two reference materials (RMs) have been maintained and distributed by IAEA and NIST.

The priority task is to maintain these primary RMs at the required uncertainty level, thus ensuring the long-term scale consistency. The second task is to introduce replacements when needed (currently for exhausted NBS19, work in progress). The next is to produce a family of lower level RMs (secondary, tertiary) addressing needs of various applications (with different delta values, in different physical-chemical forms) and their needs for the uncertainty; these RMs should be traceable to the highest level RMs. Presently there is a need for a range of RMs addressing existing and newly emerging analytical techniques (e.g. optical isotopic analysers) in form of calibrated CO<sub>2</sub> gases with different delta-13C values. All that implies creating a family of delta-13C stable isotope reference materials.

Presently IAEA works on replacement for NBS19 and planning new RMs. Besides, we found that LSVEC (introduced as second anchor for the VPDB scale in 2006) demonstrate a considerable scatter of its delta-13C value which implies a potential bias of the property value and increased value uncertainty which may conflict with uncertainty requirements for atmospheric monitoring. That is not compatible with the status of LSVEC, and therefore it should be replaced as soon as possible.

The presentation will give an overview of the current status, the strategic plan of developments and the near future steps.