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# Metrological hierarchy and traceability of stable isotope reference materials.

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Stable isotope scales for light elements (H, C, N, O and S) were first based on historical artefact reference materials (e.g. SMOW and PDB); then more suitable primary reference materials (RMs) aimed at the scale realisation were introduced (VSMOW and NBS19). Later these materials had to be replaced (by VSMOW2 and IAEA-603). There is a further category of secondary RMs which have been characterised against those primary RMs (e.g. NBS22, CH-7); majority of international RMs are at the secondary level. Other RMs (produced by commercial companies, by communities themselves), when these are characterised against secondary RMs, are at lower level. Finally, working lab-standards characterised against RMs are used for everyday practice.
All these steps form a metrological hierarchy and traceability scheme of stable isotope measurement results. In analytical chemistry in general, it is well recognised that metrological hierarchy and traceability of RMs in use is the basis for correct uncertainty propagation. However, in the area of stable isotopes much more work still needs to be done in order to optimise and agree on the uncertainty propagation approaches and schemes. At least, to recognize uncertainty components and in particular the components to be included in the uncertainty propagation, end-users have to understand a metrological hierarchy and traceability.
The presentation will be focused on metrological hierarchy and traceability of stable isotope RMs, will address uncertainties assigned to RMs, understanding uncertainty components as well as basic principles of uncertainty propagation.