CCT/17-51

# Report to the CCT from the CCT-WG-NCTh-TG-High Temperature Fixed Point Uncertainties (HTFPU)

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# Terms of Reference for the Task Group

- Objectives
  - Establish a comprehensive list of uncertainty components associated with determining *T* for high-temperature fixed points (HTFPs), categorize them into well specified or requiring further investigation;
  - Ensure format is consistent with the document Radiometric Uncertainties for direct incorporation into that document;
  - Report back to CCT WG NCTherm.

# Uncertainties pertaining to the use of high temperature fixed points

Constraints:

- existing (small-aperture) fixed points (3 mm dia.)
- Fixed points for non-contact thermometry
- Measured in furnace conditions that are typically realized now

Uncertainty components identified:

- temperature drop
- interpolation/extrapolation
- structure effect
- size-of-source effect
- identification of the point of inflection and identification of the liquidus point
- stability
- impurities
- furnace effect
- emissivity
- uncertainties of unknown origin

# Uncertainties pertaining to the use of high temperature fixed points

Components with well defined uncertainties
More work required
Values need to be assessed at each lab

Uncertainty components identified:

- temperature drop
- structure effect
- identification of the point of inflection and identification of the liquidus point
- Stability – but better values available once work-in-progress is complete
- Impurities
- Furnace effect
- Emissivity
- Uncertainties of unknown origin

- interpolation/extrapolation
- size-of-source effect

Most of these components are known only for Co-C, Pt-C and Re-C

# Work remaining for the TG

- Finish the document based on yesterday's discussion to:
  - For the items that need to be assessed at each lab (interpolation/extrapolation, size-of-source effect), include notes that these components need to be accounted for and guidance/references to do so
  - Give some guidance on how to check the quality of HTFPs (i.e. using the measured melting range
- Ensure that the results are included in the WG-NCTh document "Uncertainty Estimation in Primary Radiometric Temperature Measurement" (Peter Saunders) and communicated to the TG-NCTh-CMC
- Draft to the TG by the end of June

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# Thank you

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