CONSTRUCTION OF FIXED POINTS AT CEM

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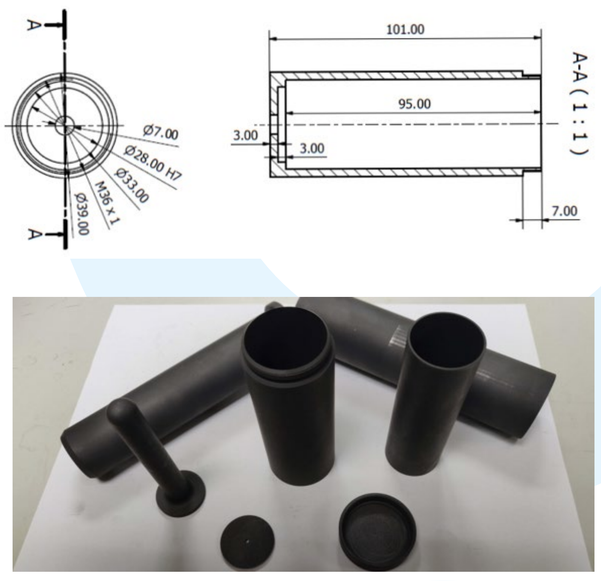
INTRODUCTION

CEM is the Spanish National Institute of Metrology responsible for the maintenance and dissemination of the Measurement National Standards. The Temperature Division is responsible for the development, maintenance and dissemination of the thermodynamic temperature unit: the kelvin.

The Institute has long experience in the dissemination and maintenance of the International Temperature Scale of 1990 (ITS-90), including working with ITS-90 fixed points and high temperature eutectic fixed points Co-C, Pt-C and Re-C. However, currently most of the fixed points at CEM are commercial or constructed with the collaboration of other institutes [1], [2]. This poster shows the new setup developed by CEM, and based in the CNAM **piston method**, to construct two Cu fixed point cells in order to be used as reference blackbodies for radiation thermometry. Measurements and plateaus of such fixed points are also presented.

FILLING PROCESS

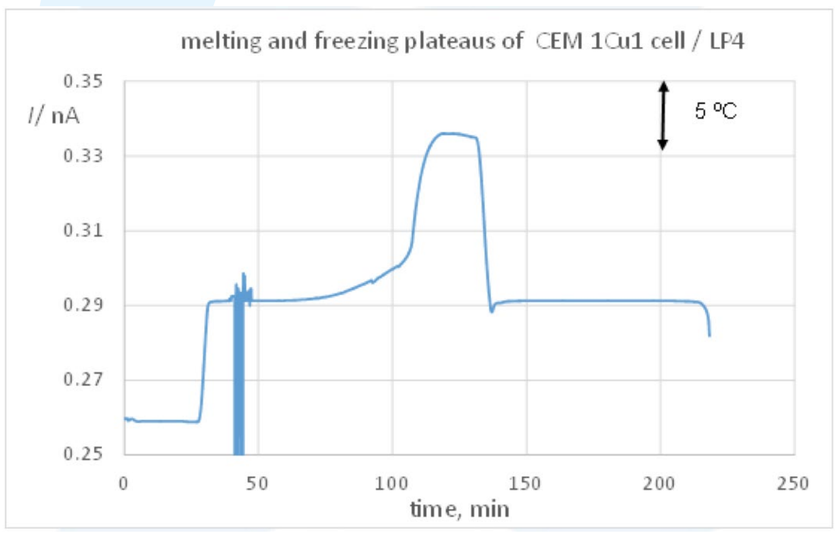
Crucible and additional graphite parts

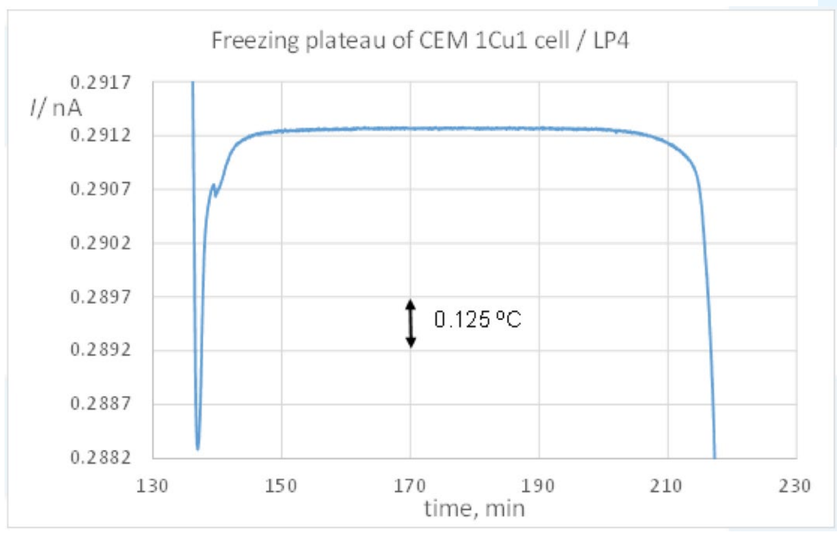


Filling process

Cu Cells

MEASUREMENTS AND TEMPERATURE VALUE ASIGNATION





1Cu1 cell:

t_{90} = 1084.62 °C ± 0.10 °C

t = 1084.58 °C ± 0.19 °C

1Cu2 cell:

t_{90} = 1084.65 °C ± 0.10 °C

t = 1084.61 °C ± 0.19 °C

CONCLUSIONS

Designing, construction, filling and assignment of temperature to new Cu fixed point cells have been performed with highly succeed by CEM. These cells have been used for radiation thermometry and they are the starting point in the construction of CEM reference fixed points cells for the calibration of radiation thermometers as well as for the calibration of thermocouples.

[1] "A comparison of the Melting Temperatures of two high temperature fixed point cells between LNE-CNAM and CEM" M. J. Martin, F. Bourson, C. García-Izquierdo, M. Sadli. Tempmeko'16. Zakopane, Poland, 2016

[2] "Construction and comparison of high temperature fixed points at NRC and CEM" J. M. Mantilla, M. J. Martin, D. del Campo, A. Todd. Sent to Tempmeko'19. Chengdu, China.

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