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IAEA NAPRO Coordinated Research Project: Physical Properties of Sodium Overview of the Reference Database and Preliminary Analysis Results

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The International Atomic Energy Agency (IAEA) recently launched a coordinated research project (CRP) on "Sodium properties and safe operation of experimental facilities in support of the development and deployment of Sodium Cooled Fast Reactors - NAPRO", to be carried out in the period 2013 –2017. The first phase of the CRP is focused on the collection and assessment of sodium properties, and it will lead to a consistent property data set which will be published in the form of a handbook. This work is carried out by several participating organizations from 10 Member States through the review and evaluation of the existing available data, the identification of the data gaps and the development of recommendations for the experimental programmes to support closing these data gaps.

A specific work package (WP 1.1), under the leadership of Argonne National Laboratory, is focused on the analysis of physical properties of sodium: thermodynamic properties (including gaseous state) and transport properties. The expected outcome includes the improved understanding of the availability, accuracy and range of applications of sodium properties focused on fast reactors and other technological applications.

In this work a detailed overview of the collected references is presented, identifying the most reliable and useful sources of information and showing the depth and breadth of the collected reference database. In addition, the limited availability of recent experimental data and the lack of information on data uncertainty are discussed as well as the approach the CRP nevertheless adopted to characterize data quality. Significant findings related to WP 1.1 are also presented in this work, focusing in particular on inconsistent data sets of properties that are commonly considered well determined and known and that the CRP has instead found to be characterized by unexpected variability between different data sources.

Country/Int. Organization

ANL, CNEA, KIT, JAEA, IGCAR, IPPE, CIAE, NRG, CEA, IAEA

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