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FAIR DATA IN PLATFORM MATERIALDIGITAL (PMD): ONTOLOGIES, SEMANTIC DATA INTEGRATION AND DATA EXCHANGE

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Following the new paradigm of materials development, design, and optimization, digitalization is the main goal in materials sciences and engineering (MSE) which imposes a huge challenge. In this respect, the quality assurance of processes and output data as well as the interoperability between applications following FAIR principles are to be ensured. For storage, processing, and querying of data in contextualized form, Semantic Web technologies (SWT) are used since they allow for machine-actionable and human-readable knowledge representations needed for data management, retrieval, and (re)use.

The project 'platform MaterialDigital' (PMD)[1] aims to bring together and support interested parties from both industrial and academic sectors in a sustainable manner in solving digitalization tasks and implementing digital solutions. Therefore, the establishment of a virtual material data space and the systematization of the handling of hierarchical, process-dependent material data are focused. Core points to be dealt with are the development of agreements on data structures and interfaces implemented in distinct software tools and to offer users specific support in their projects. Furthermore, the platform contributes to a standardized description of data processing methods in materials research. In this respect, selected MSE methods are semantically represented which are supposed to serve as best practice examples with respect to knowledge representation and the creation of knowledge graphs used for material data.

Accordingly, this presentation shows the efforts taken within the PMD project towards the digitalization in MSE such as the development of the mid-level PMD core ontology (PMDco)[2]. Furthermore, selected results of a PMD partner project use case addressing data and knowledge management from synthesis, production, and characterization of materials are shown.

1 https://materialdigital.de
2 https://github.com/materialdigital/core-ontology