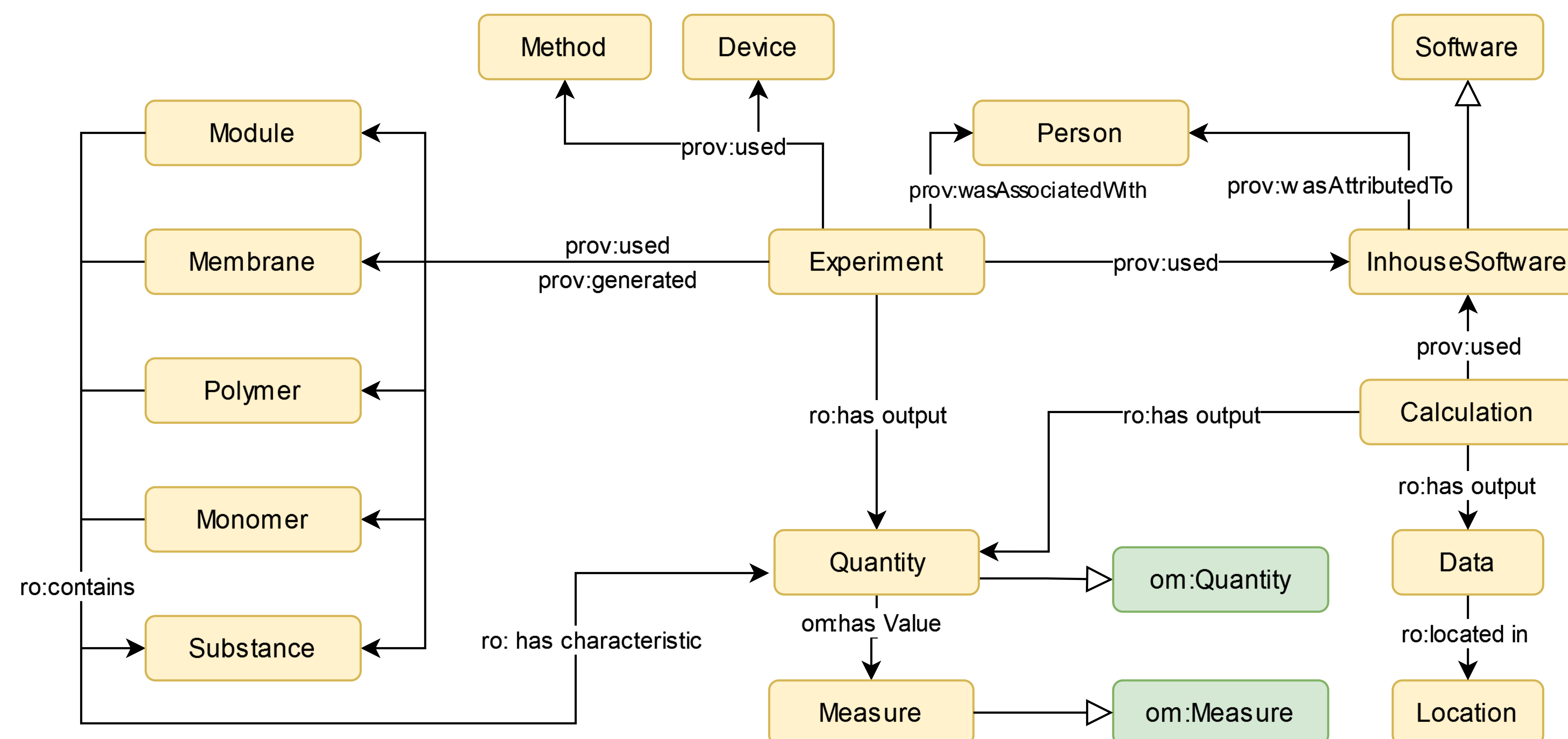


Supporting Polymer Membrane Research: Enabling Semantics with PolyMat Ontology

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Summary of the PolyMat ontology. PolyMat classes are colored in yellow and classes from re-used ontologies in green. Subclasses are indicated by a white-headed arrow.

Summary

- **PolyMat** – domain ontology for polymer membrane research designed for use **within** ELNs
- **Development** in close collaboration with domain experts and ELN developers
- **Application** – semantic (meta)data annotation, knowledge representation of experimental research, automatic form generation
- **Further reuse** in modelling laboratory processes

Online Resources

Resource Type	Ontology
URL	https://w3id.org/polymat/
Gitlab	https://gitlab.com/dlr-dw/poly-ontologies/polymat-ontology
DOI	10.5281/zenodo.10286389
TiB Terminology Service	https://terminology.tib.eu/ts/ontologies/pmat

Motivation

- ❑ Bringing semantics to polymer membrane research and digital (meta)data acquisition in ELNs
- ❑ Creating semantically rich and reusable knowledge for domain experts and machines
- ❑ Efficiency boost in research data management and laboratory processes
- ❑ Enabling interoperability with domain-level ontologies
- ❑ Alignment with top-level ontologies

Core components of PolyMat

- ❑ Material entities including polymers, membranes etc.
- ❑ Roles for flexible use of entities
- ❑ Creation and analysis methods of all elements in polymer and membrane technology

Ontology reuse and resource integration

- ❑ Top-level ontologies: BFO and RO
- ❑ ELN integration: PROV-O reuse for reproducibility
- ❑ Domain and specific ontologies: ChEBI and OM

Benefits

- ❑ (Meta)data semantic annotation and knowledge representation of laboratory processes
- ❑ Enabling standardized, FAIR-compliant data collection across experiments

Application

- ❑ Automatic form generation in Herbie ELN
- ❑ Supporting consistency checks