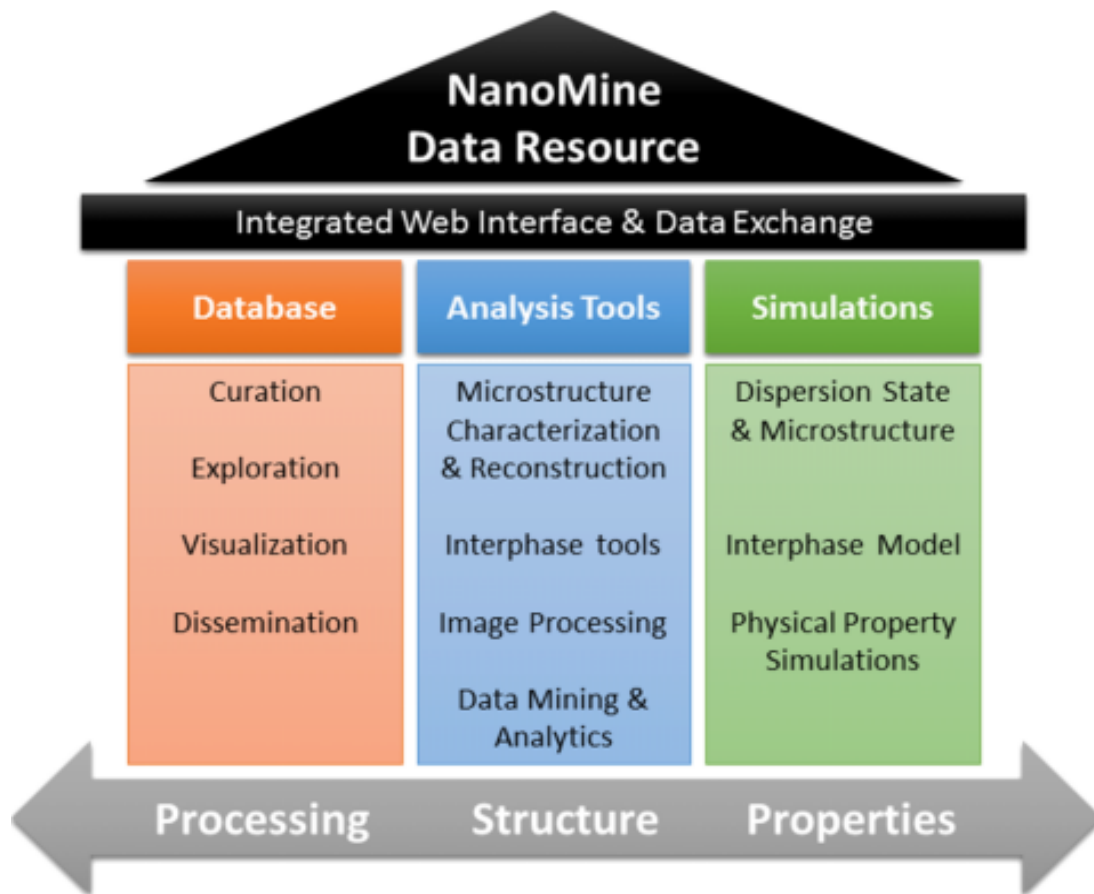


Perspective: NanoMine: A Material Genome Approach for Polymer Nanocomposites Analysis and Design

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Caption: Overview of NanoMine components and highlight of some active features in each component

Scientific Achievement

A prototype web-based data resource for polymer nanocomposite materials, named NanoMine, have been built and accessible at nanomine.northwestern.edu.

Customized data schema (template) has been constructed to archive processing, structure, property, and metadata associated with nanocomposite samples from literature and experimental data. Data curation has included more than 500 distinct samples from journals. Microstructure image processing as well as statistical characterization and reconstruction tools, along with other polymer data pre-processing tools and finite element simulation modules, have been built as web apps for public use. A data-driven material property prediction framework has been established leveraging data and tools built and will be extended for robust new material design.

Significance

Polymer nanocomposites are an important class of advanced functional materials, yet they have been seldom explored in recent MGI efforts and cannot be effectively addressed by MGI tools developed for alloys. We are building a live, evolving, open source, open data resource for polymer nanocomposite R&D community by incorporating open data and methodology sharing in order to accelerate new material design through data-driven approaches.

Citation

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