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# Nomenclature

**DFT.** Classical Density Functional Theory. A framework based on electronic DFT for modeling the spatial variation in the number density of classical particles by minimizing the free energy density functional of the density profile of these particles.

**Difunctional.** Describes a polyol that has two hydroxyl groups (OH) per polymer chain.

**Foam.** A gas dispersed in a liquid or solid matrix.

**Functionality.** Average number of hydroxyl functional groups per polymer chain..

**Gravimetry–Axisymmetric Drop Shape Analysis (G-ADSA).** A technique that combines precise measurement of the weight of a liquid–gas mixture using a sensitive balance (gravimetry) and image analysis of a pendant drop of the same mixture (axisymmetric drop shape analysis) to measure gas solubility, specific volume, gas diffusivity, and interfacial tension simultaneously.

**Harvey Nucleus.** A pocket of vapor trapped in the crevice of a solid surface that produces bubbles without nucleation as the pocket of vapor grows large enough for a bubble to detach.

**Heterogeneous Nucleation.** Nucleation that occurs with the aid of a surface, often in a niche or crack within it. The aid of the surface reduces the supersaturation required for nucleation.

**Homogeneous Nucleation.** Nucleation that occurs in the bulk phase. Without the aid of a surface, the supersaturation required for nucleation is much greater than for heterogeneous nucleation.

**ISCO Pump.** A brand of high-pressure syringe pump providing high-precision, pulseless flow. Commonly used in high-pressure microfluidics and supercritical $CO_2$ applications.

**Knudsen Effect.** Reduction in the thermal conductivity of a gas as a result of confinement below its mean free path, which effectively shortens the mean free path.

**Mother Phase.** The medium from which a new phase can nucleate upon supersaturation.

**Nucleation.** The local formation of a new phase through a first-order phase transition, which requires the system to overcome a free energy barrier.

**PC-SAFT.** Perturbed Chain–Statistical Associating Fluid Theory, an equation of state published by Gross and Sadowski in *Industrial and Engineering Chemistry Research* (2001).

**Physical Blowing Agent (PBA).** A volatile, non-reactive compound that vaporizes upon modest heating to generate a foam.

**PPG.** Polypropylene glycol.

**RMSSFE.** Root mean signed squared fractional error, the mean of each squared error multiplied by the sign of the error.

**RPUF.** Rigid Polyurethane Foam, a foam commonly used for thermal insulation in refrigeration units, coolers, and buildings.

**Small-Angle X-ray Scattering (SAXS).** X-ray scattering technique that detects only X-rays scattered at angles between 0.1°–10° from the incident beam axis. These angles correspond to features on the length scale of 1–100 nm.

**String Method.** A method for identifying the most probable path between two states in a free energy landscape by minimizing the free energy barrier along that path. Often described as the result of a pulling a string taut between the two states.