



NanoSIMS Cryo: Preserving Native Chemical Distributions by Cryogenic Imaging



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TOPIC / ABSTRACT

Understanding **how elements and isotopes are distributed** at the **micro- and nanoscale** is essential **life sciences to soft materials**. However, observing this chemical heterogeneity remains challenging because sample preparation itself can modify the distribution of mobile chemical species.

Conventional preparation methods for biological samples, involving dehydration and resin embedding, can lead to the loss, dilution or redistribution of ions and small molecules. Similarly, the native chemical organization of soft and hydrated materials can be difficult to preserve and investigate under conventional analytical conditions. **Cryogenic preparation and analysis provide an alternative** by maintaining samples in a frozen-hydrated state from preparation through imaging.

This webinar will introduce **NanoSIMS Cryo**, an approach **combining cryogenic sample handling** with **high-spatial-resolution elemental and isotopic imaging**. **Two applications will illustrate its capabilities**. In neurons, cryogenic imaging preserves heterogeneous intracellular distributions of key elements such as sodium, potassium, magnesium and calcium that are strongly reduced after resin embedding. In a model food foam, the method reveals the redistribution of phospholipids and water following foaming, providing insight into the chemical organization of interfaces involved in foam stability.

These examples illustrate how cryogenic chemical imaging can provide new information on the native organization of complex biological and soft materials.



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