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Machine learning to push the limits of time-of-flight secondary ion mass spectrometry.

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Time-of-flight secondary ion mass spectrometry (ToF-SIMS) obtains chemical information on a sub-micron scale. Traditionally, experts analyze the spectra in a time-consuming manner, and the complexity of the data limits what can be extracted by inspection. Machine learning could push the limits of ToF-SIMS on various aspects. Machine-learning-enhanced identification of atomic and molecular fragments could increase the effectiveness of ToF-SIMS, especially when considering biological samples with convoluted spectra. Interlaced measurements of ToF-SIMS and scanning probe microscopy (SPM) allow the chemical maps to become three-dimensional. Additionally, images generated by image fusion based on deep learning could allow rapid examination of material composition.

Poster title

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