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SESAME BM02-IR Microspectroscopy beamline: a plethora of opportunities

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Accelerators-based sources are super microscopes implementing various sets of experimental techniques those are powerful enough to reveal the most vital details about matter. They can shed light on invisible particulars in physics, chemistry, biology, pharmaceuticals and biomedicine, environment and materials science.

The high brightness delivered by these sources allows to compensate for some of the restrictions imposed by conventional sources. Among these, Synchrotron Radiation Fourier Transform Infrared Microspectroscopy, SR-FTIR μ , which is extensively used in cultural heritage and archaeological samples' investigations. This is because of the distinguished benefits of the lateral resolution offered by SR-FTIR which is reflected as improved data quality regardless of the roughness and the heterogeneity of the samples, better signal-to-noise ratio, and short data acquisition time.

In this regard, the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) stands as a major scientific hub for archaeological and heritage domains being the only synchrotron light facility in the Middle East and its neighboring regions. It is an intergovernmental organization aims at promoting advanced research capabilities and technology and considered as the region's bridge to peace and mutual understanding. It is the first facility of its kind in the region, and its current Members are: Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, Palestine and Türkiye. The SESAME BM02-IR Microspectroscopy beamline was implemented in the framework of a partnership agreement between SESAME and the SOLEIL Synchrotron facility in France. It came into operation in November 2018 to serve users of the infrared scientific community. The beamline utilises both edge and constant field radiation presenting a powerful tool for a variety of research fields based on the identification and imaging of IR-active vibrational modes of molecular components at microscopic scale.

Herein, examples in the domains of life sciences, archaeology, cultural heritage, water pollution, and pharma, will be highlighted.

In addition, with the challenges that the Middle East and Africa are similarly facing, a special highlight will be presented on the role that SESAME plays as a model for the African community.

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