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Progress on the development of metal salt-assisted ionization source for mass spectrometric analysis of polymers

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The mass spectrometric analysis of Polymers has been addressed as a challenging research due to poor ionization and complicated analysis using conventional mass spectrometry. The ionization source has demonstrated a promising future in rapid mass spectrometric analysis. Soft ionization techniques such as Electrospray Ionization (ESI) and Matrix-Assisted Laser Desorption/Ionization (MALDI) are the most ionization sources appeared to be a powerful tool for polymer characterization when combined with MS. However, they always need the metal salts to be introduced during the ionization protocol for polymers due to the crucial role played by their ions (cations and anions). The current review focuses on the progress in the development of metal-ion assisted-ionization sources for mass spectrometric analysis of polymers. Different ionization systems are comprehensively reviewed. The application of metal ion-assisted ESI, NanoESI, PSI and MALDI-MS for polymer sample analyses is systematically discussed. The future research trends and challenges in this cutting-edge research field are summarized. It also aims to provide the current state-of-the-art of metal salts as a platform for ionization systems for mass spectrometric characterization of polymers and offers the current challenges and perspectives on the promising future to improve analytical performance in this field. Finally, this mini-review would provide a comprehensive handbook to researchers from different research backgrounds wishing to work in this area.

Recent publications

1. Muyizere, Theoneste & Mukiza, Janvier. (2022). Progress on the Development of Metal Salt-Assisted Ionization Source for Mass Spectrometric Analysis of Polymers. *Analytical Methods*. 14. 10.1039/D2AY00724J.
2. Muyizere, Theoneste & Zheng, Yajun & Liu, Hongni & Zhao, Jia & Li, Jin & Lu, Xianming & Austin, Daniel & Zhang, Zhiping. (2020). Correction: Metal salt assisted electrospray ionization mass spectrometry for the soft ionization of GAP polymers in negative ion mode. *The Analyst*. 145. 10.1039/DOAN90027C.
3. Han, Weiwei & Zheng, Yajun & Muyizere, Theoneste & Zhang, Zhiping. (2018). Development of paper substrate for paper spray MS in high-sensitivity analysis of biological samples. *Bioanalysis*. 10. 10.4155/bio-2018-0199.

Biography

Theoneste Muyizere completed his master's degree (MSc) in Applied Chemistry with the specialty of analytical chemistry in 2019, with research distinction from Xi'an Shiyou University, China. Currently, he is perusing Ph.D. degree at the University Of Chinese Academy of Sciences, National Center for Nanoscience and Technology. His current research interest lies development of nano-bioanalytical platforms for biomedical applications through synthesis, design and engineering of nanomaterials.

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