Materials and Methods

TXRF development and application

TXRF's early development

Since Yoneda [1-3] used total re ection technique to XRF for the rst time in 1971, they have been able to identify uranium in saltwater, iron in blood, and rare earth elements in hot spring water. eoretical underpinnings and experimental settings were later examined. Wobrauschek conducted a doctoral thesis on the issue in Vienna, Austria [14], and he and Aiginger reported detection limits of nanograms [1-5] [1-6]. Knoth and Schwenke discovered element evidence at the ppb level at Geesthacht, Germany, which is close to Hamburg [1-7] [1-8]. Following 1980, a wide range of uses encouraged a burgeoning interest, leading to a rise in the number of instruments in use to about 200 globally. e rst total re ection X-ray uorescence spectrometer for commercial use was successfully created in 1981 by the West German Rich Seifer Corporation. e TXRF instrument has since been rapidly developed and enhanced in both development and application. Several TXRF lectures have been held abroad since 1984 [1-9]. e Institute of High Energy Physics [1], the Institute of Modern Physics [2], and the Chinese Academy of Atomic Energy have led China in the creation of TXRF analysis equipment as well as the study and promotion of analysis techniques since the 1990s.

Table 1: TXRF early development goes through numerous signi cant phases.

Time	Representatives	Main work
1971	Yoneda Y, Horiuchi T	First proposed to apply total re fection technology to XRF
1978	Knoth, J. and Schwenke, H	Found element traces on the ppb-level
1981	Rich Seifer West Germany	Successfully developed the rst commercial total re fection X-ray uorescence spectrometer
1983	Becker	Studied the relationship between uorescence intensity and angle below the critical angle
1986	Iida, A., Yoshinaga, A	Apply synchrotron radiation to TXRF
1991	Wobrauschek, Aiginger, Schwenke, and Knoth	Won the distinguished Bunsen?Kirchhof Prize for the development of TXRF
1997	Klockenkamper	Publication of the rst monograph on TXRF

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state o electrons in atoms characteristic X rays produced ionisation or e citation correspond to particular atoms ased on their energy th a ualitative and a antitative analysis o the elements is possi using Moseley's law and the eman e ation Total reection reduces the ckground count signicantly cause the primary rays are released in the incident direction and can rarely detected the detector le incident and wide reected waves inter re reating

Conclusion

With the initial use of total re ection technology for XRF in 1971, 50 years have passed. In this time, TXRF has advanced quickly. e background brought on by scattering has been eliminated using XRF, allowing for the analysis of ultra-trace components. It addresses the issue of multiple measurements.

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We can successfully complete the paper with the aid of our peers and professors.

Competing Interest

According to the authors, they have no competing interests that would prevent this study from being published.

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