

Suppressed Gamma-Spectrometry for Comprehensive Nuclear-Test-Ban Treaty Samples

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) is supported by a network of certified laboratories that perform high-resolution gamma-spectrometry on global air filter samples for the identification of 85 radionuclides. At the UK CTBT Radionuclide Laboratory (GBL15), the use of advanced Compton suppressed systems has been investigated to reduce the Compton continuum and improve detection sensitivity. Samples collected from the Philippines and during the Fukushima incident have been measured, demonstrating Compton continuum reductions of 28 - 59% with suppression factors of 0.1 - 147.0. Detection sensitivity has been improved with typically 40% lower MDAs, including ^{140}Ba to meet CTBT requirements. True coincidence summing effects have been considered, including the application to remove interferences by the elimination of gamma-rays in cascade. This has been demonstrated for the removal of ^{134}Cs allowing improved ^{131}I measurement.

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Track Classification: Theme 3: Advances in Sensors, Networks and Processing