A Maximum Log-Likelihood Regression Approach for Quantitative Mixture Prediction in PGNAA Spectroscopy

ID: 131

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① The scrap is irradiated with a beam of neutrons.

② Through nuclear reaction, the material emits prompt gamma rays, which are measured with a gamma ray spectrometer.

③ The measured gamma spectra are recorded and

④ a regression model (e.g. maximum log-likelihood estimation) is used to predict the material composition.

⑤ After predicting the composition, the material can be recycled in a targeted way.

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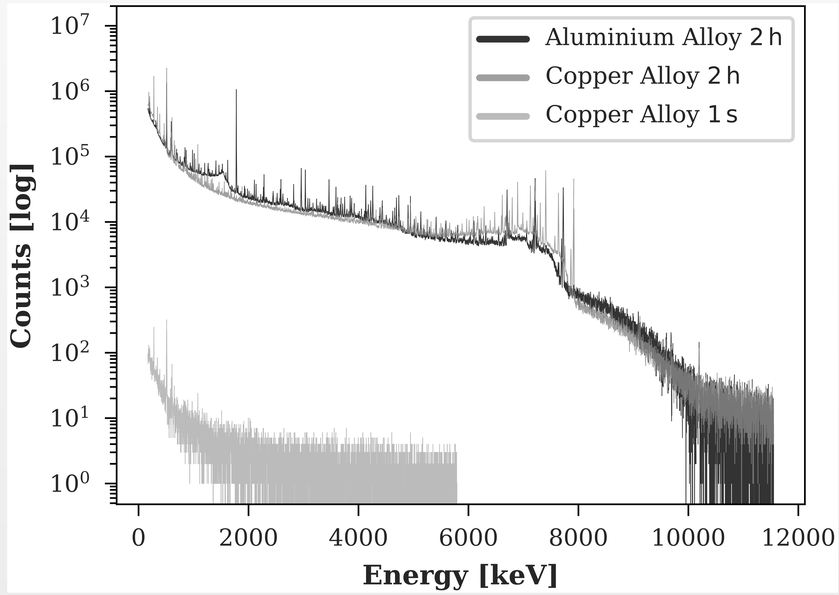
- Previous approaches were based exclusively on long-time measurements (>2 h).
- For metal recycling, the challenge is noisy short-time measurements.
- A maximum likelihood-based approach enables real-time composition estimation from simulated noisy short-time measurements.
- For a Cu–Al alloy, the 7% Al content is estimated with high accuracy within $\sim$ 1 second.



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