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identification in EDS Measurements using multiple subset sum problem formulation

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In the framework of the everyday activity of NDCs analysts, accurate EDS analysis is generally achieved through a correctly identification of various spectral picks and other features of the spectrum. However, in practice, it is easy to misidentify the X-ray picks based on preconceptions of the result and due to presence of cumulated peaks even though the analyst think it should not. In fact, one of the most common errors made by EDS novices is the failing to identify X-ray peaks. One of the main reasons for the misidentification of X-ray peaks is due to the presence of the cumulated peaks. Cumulated peak was generally caused by accumulation of different possible values of emitted energies for a certain nuclide present in the spectrum which makes identification difficult. So, the matching of unidentified or cumulated peaks with adequate nuclides can be viewed as a combinatorial problem. To solve this problem and identifies some peak, we propose in this work a compact formulation of the problem as an integer linear program. The problem can be equivalently formulated as the well-known decision problem called the multiple subset sum problem which it can easily be solved in pseudo-polynomial time using dynamic programming.

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