

Characterization and Classification of Lanthanides by Fuzzy Clustering

C. SÂRBU*

Faculty of Chemistry and Chemical Engineering,
Babeş-Bolyai University, Arany Janos Str., No
11, RO-400028, Cluj-Napoca, Romania
(*correspondence: csarbu@chem.ubbcluj.ro)

In this investigation, Fuzzy Hierarchical Cross-Clustering Algorithm [1, 2] has been applied for simultaneous clustering of lanthanides and their mainly physical properties, with only the Gibbs energy of formation of the chloride as a chemical property. The results obtained have been allowing an objective interpretation of the similarity and differences of lanthanides and group them in a good agreement to other classification models. Much more this very informative fuzzy clustering approach allows the qualitative and quantitative identification of the properties responsible for the observed (dis)similarities between lanthanides according to the membership degrees to the final partitions.

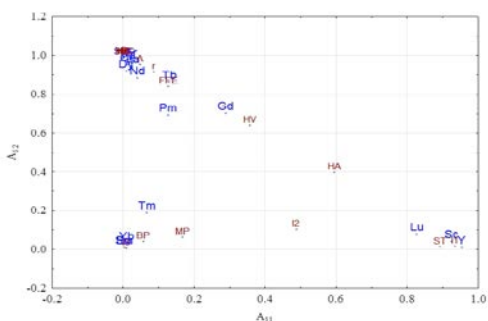


Figure 1. A11 vs A12 scatterplot of the membership degrees corresponding to lanthanides (times blue) and their properties (Arial reddish).

Acknowledgments: Participation was possible with the financial support of the PN-II-ID-PCE-2011-3-0366 project.

[1] Sârbu (1999) Fuzzy Classification of the Chemical Elements in *Encyclopedia of Library and Information Science*, Kent & Williams (eds.), Marcel Dekker, New York, 112-138. [2] Sârbu & Pop (2004) Fuzzy Soft-Computing Methods and Their Applications in Chemistry in *Reviews in Computational Chemistry*, Lipkowitz *et al.* (eds.), Wiley-VCH, Chapt. 5, 249-332.