# Evaluation of La(III) and Ce(III) adsorption from aqueous solution using carbon nanomaterials

*I. García-Diaz[(1)], F. A. López[(1)], and F.J.Alguacil[(1)]*

*[(1)]National Center for Metallurgical Research (CENIM-CSIC), Madrid, Spain*

**Abstract:**
Currently rare earth elements (REE) refer to a group of 17 elements consisting f the 15 lanthanides plus SC and Y. Although more abundant than precious metals, REE are often dispersed in ore deposits, which makes their extraction difficult. Furthermore, due to their chemical similarities, individual separation of the elements is also problematic.
REE have a great strategic importance, being widely used in field such as nuclear energy, metallurgy, electronics, chemical engineering, computers etc, the demand for them increases and is expected to correspondingly increase in time. Five of the most critical REE until 2025 are neodymium (magnets), europium and yttrium (phosphors and luminescence), and cerium and lanthanum (metal alloys, batteries, glass and catalysts).
So due to their high economic value it is essential recover them [1]. The development of new technologies to recover REE or improvement the existing knowledge is continuous.
Solid phase extraction is an important methodology to recover these strategic elements due to easy adaptation. So the look for new adsorbent is constant [2-3].
The aim of the present research was to investigate the adsorption of Ce (III) and La(III) two critical REE onto multiwalled carbon nanotubes (MWCNT) and carboxylic multiwalled carbon nanotubes (MWCNT-ox) in order to recuperate these rare earth.
Several parameters, such as pH, stirring speed, temperature etc. were studied. Figure 1 present the effect of the a pH on the adsorption of La and Ce onto the MWCNT-ox.
Around 98.5 and 93.8% of La and Ce was adsorbed onto MWCNT-ox. A slightly increase in adsorbent 99.3% for La and 98.8% for Ce.

**References**:
[1] K. Wang, H. Adidharma M. Radosz, P. Wan, X. Xu, C.K. Russell Tian H., Fan, M., Yu J., *Green Chem.*, **19**, (2017) p. 4469-4493.
[2] S. Lu, J. Xu, C. Zhang, Z. Niu, *J. Radional. Nucl. Chem.*, **287,** (2011) p. 893-898
[3] J. Jacinto, B. Henriques, A.C. Duarte, C. Vale, E. Pereira, *J. Hazard. Mater.*, **344**, (2018) p. 531-538.