SENSIBILIDAD DE DIFERENTES TIPOS DE USO DE LA TIERRA ASOCIADOS CON LOS PATRONES DE MIGRACIÓN MÁS IMPORTANTES PARA LOS CONTAMINANTES (Meuser, 2013)

Classes	Utilisation	Main migration pathway
Highly sensitive	Playgrounds, school grounds	Soil – child (direct contact)
	Gardens, cropland, pasture	Soil – useful plant – human
	Water reserves	Soil – drinking-water – human
Sensitive	Sports fields	Soil – human (direct contact)
	Residential areas	Soil – human (direct contact)
	Outdoor swimming-pools	Soil – human (direct contact)
Low sensitive	Parks	Soil – human (direct contact)
	Forest	–
	Industrial and commercial sites	–
Non-sensitive	Traffic areas, car parks	–
	Sealed areas	–

Elementos raros de la Tierra

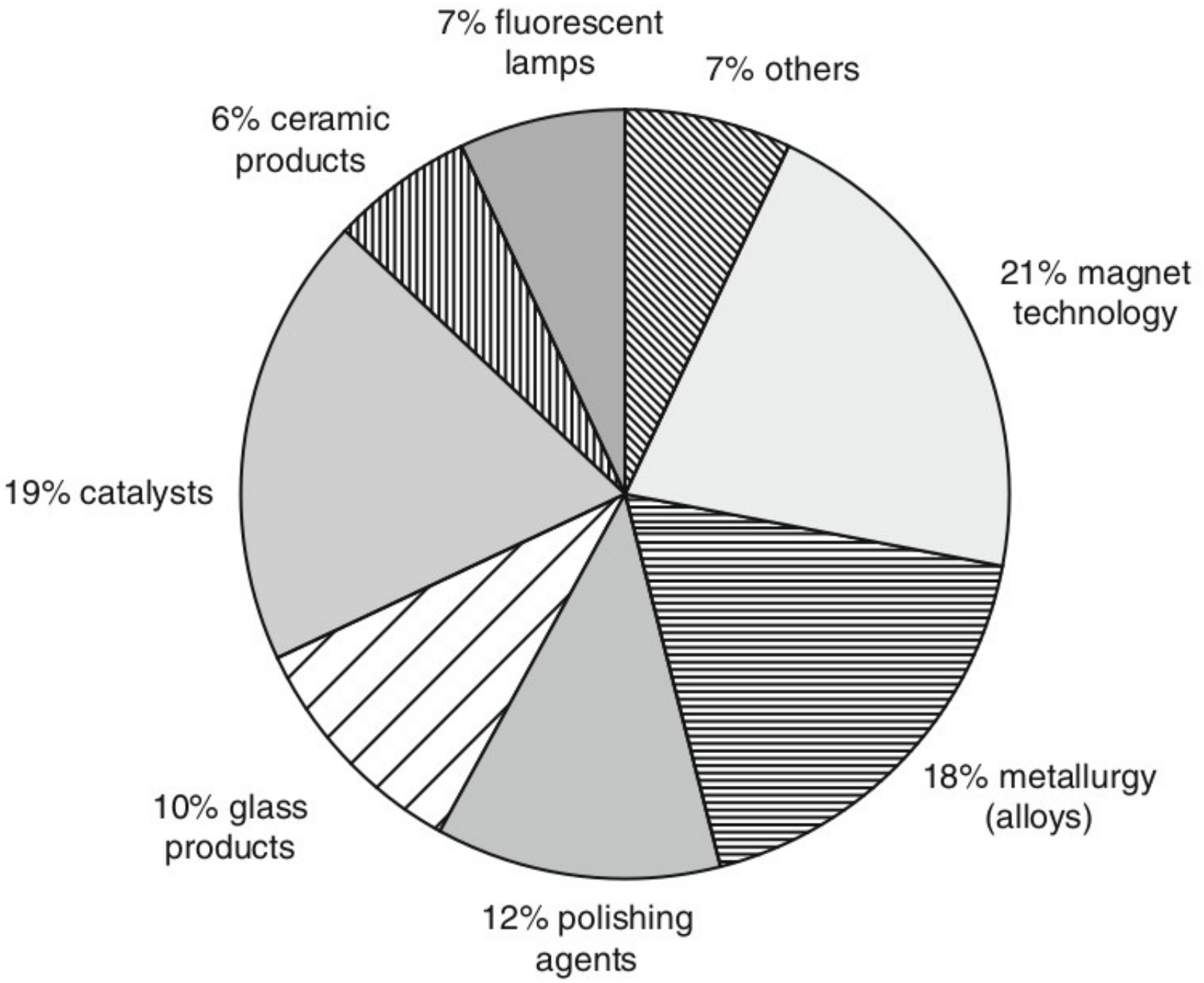
- Su nombre se debe a que usualmente se encuentran concentrados en pocos lugares de la Tierra, aunque sus cantidades en la corteza puede ser superior a la de otros elementos tales como el Cr, Ni y Zn.

Elementos raros de la Tierra

- Escandio (scandium, Sc)
- Itrio (yttrium, Y)
- 15 lantánidos (Ln):

Cerio (cerium, Ce)	Neodimio (neodymium, Nd)
Disprosio (dysprosium, Dy)	Praseodimio (praseodymium, Pr)
Erbio (erbium, Er)	Promesio (promethium, Pm)
Europio (europium, Eu)	Samario (samarium, Sm)
Gadolinio (gadolinium, Gd)	Terbio (terbium, Tb)
Holmio (holmium, Ho)	Tulio (thulium, Tm)
Lantano (lanthanum, La)	Iterbio (ytterbium, Yb)
Lutecio (lutetium, Lu)	

Utilización de los elementos raros en actividades industriales



Elementos raros de la Tierra

- Efectos en el suelo:

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JOURNAL OF RARE EARTHS, Vol. 28, No. 6, Dec. 2010, p. 957

JOURNAL OF RARE EARTHS
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Effects of the accumulation of the rare earth elements on soil macrofauna community

LI Jinxia (李金霞)[1,2], HONG Mei (红 梅)[3], YIN Xiuqin (殷秀琴)[1], LIU Jiliang (刘继亮)[4]

(1. College of Urban and Environmental Science, Northeast Normal University, Changchun 130024, China; 2. Faculty of Resources and Environment, Baotou Teachers' College, Baotou 014030, China; 3. College of Ecology and Environment, Inner Mongolia Agricultural University, Huhhot 010018, China; 4. Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou 730000, China)

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Recent studies have shown that Nematodes, Enchytraeids, Earthworms, Acarida, Collembola, Isopods and Gastropods are all good potential biological indicators of soil pollution[20]. In this study, the individual numbers of Carabidae and Dermaptera reduced with increasing REEs concentrations, which suggests that they may indicate soil REE pollution. The REE pollution of soil had no significant effect on the individual numbers of Formicidae. Large numbers of *Stibaropus formosanus* were present in the extremely polluted sites and became dominant group (there were no *Sti-*

Elementos raros de la Tierra

- Los contenidos en el suelo están altamente influenciados por:
  - El material parental
  - El estado de intemperización y génesis del suelo (procesos pedogenéticos)
  - Textura, tipos de arcilla y contenido de materia orgánica
  - Se ha identificado un incremento gradual en os contenidos de estos elementos debidoa atividades humanas:
    - Actividades industriales
    - Agricultura
    - Minería

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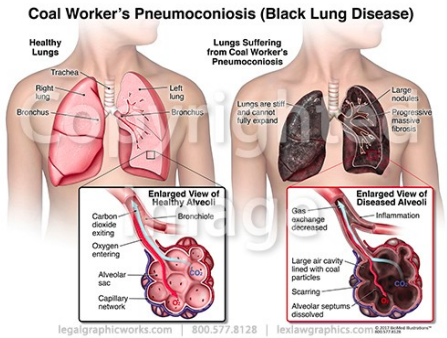
Distribution and fractionation of the rare earth elements in Brazilian soils

Henrique de Sá Paye [a,*], Jaime W.V. de Mello [a,b],
Gustavo Rocha Lima de Magalhães Mascarenhas [a], Massimo Gasparon [b,c]

In recent years, studies on trace elements including heavy metals, rare earth elements and radionuclides (Andersen et al., 2002; Doelsch et al., 2006; Li et al., 2008; Martin, 1997; Matschullat et al., 2012; Zhu and Shaw, 2000) have gained public attention because many illnesses have been associated with high concentrations of these elements in food and water due to soil pollution. The threat that these elements pose to human and animal health is aggravated by their long-term persistence in the environment.

Elementos raros de la Tierra

- La exposición continua a los elementos raros puede causar daño a los sistemas circulatorio, inmunológico, digestivo, respiratorio y nervioso.
- Puede hacer decrecer el cuociente intelectual de los niños.
- Puede incrementar el riesgo de desarrollar arterioesclerosis y neumoconiosis.



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Currently, the use of REEs is closely associated with high-tech industry. The increasing use of REEs in industrial processes suggests that REE release into the environment is likely to increase in the future with potential impacts on human health (Sadeghi et al., 2013). Under this scenario, it is necessary to establish the natural REEs concentration in soil in order to monitor the impacts of human activity and understand the extent of the anthropogenic influence on the environment.

Especiación de los elementos raros

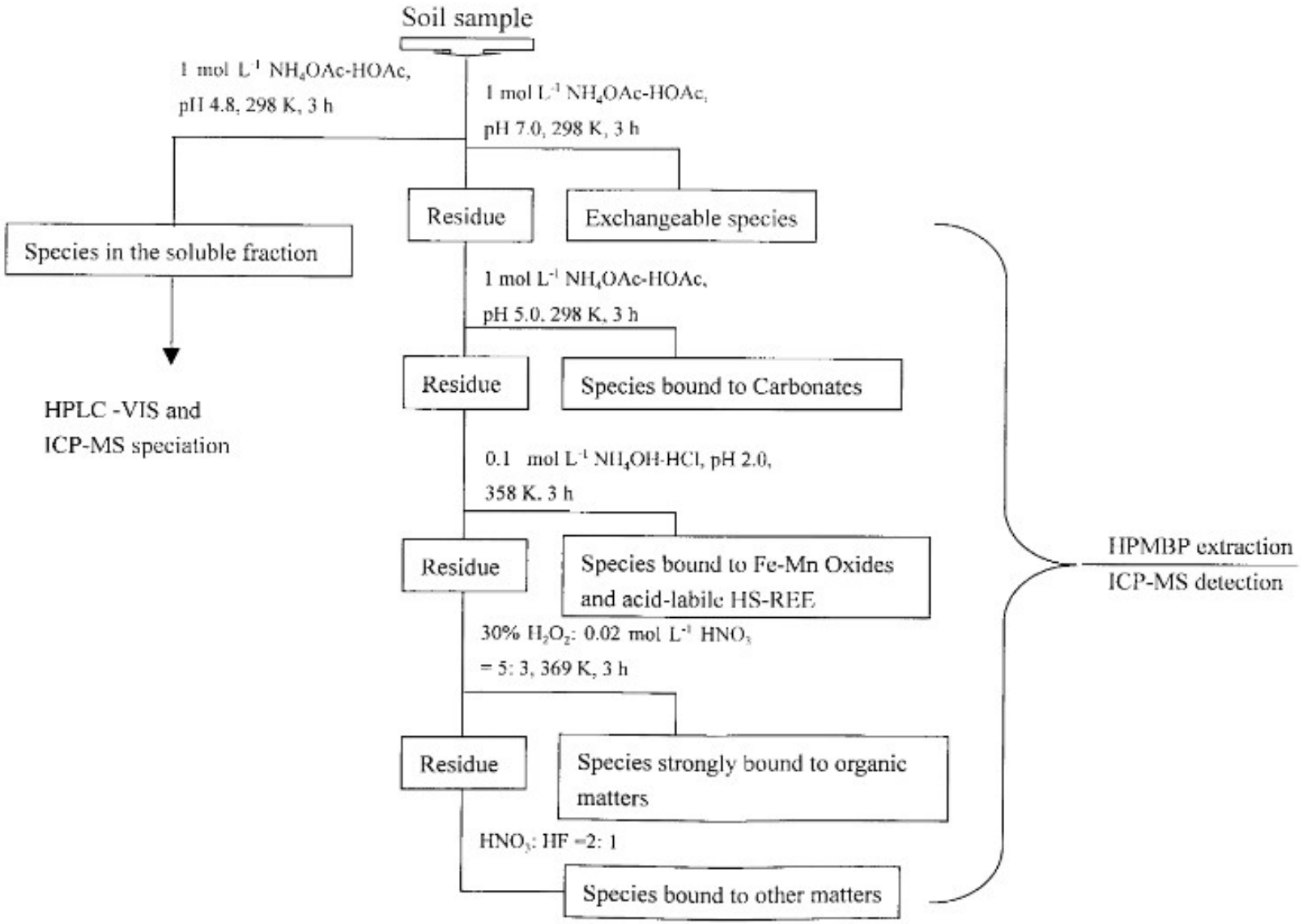
The distribution of REE in the different fractions follows the order: soluble species (46.76%) > species bound to organic matters (22.08%) > species in the residue (16.77%) > species bound to Fe–Mn oxides (2.02%). The soluble species defined here might include exchangeable species, species bound to carbonates, and also labile REE organic complexes. It should be noted that soluble REE species in the soil sample constitute the source of REE that might be potentially bioavailable and, in turn, toxic under some conditions, e.g. high concentrations, low soil pH, etc. The average amount of soluble REE in soil is usually approximately 10% of the total REE [44]; in the soil sample

Fresenius J Anal Chem (2001) 370 : 1041–1047

SPECIAL ISSUE PAPER

Qiuquan Wang · Benli Huang · Zhenwei Guan
Limin Yang · Bin Li

Speciation of rare earth elements in soil by sequential extraction then HPLC coupled with visible and ICP–MS detection



Extracción secuencial de Elementos Raros de la Tierra, en el suelo