

Heterogeneous mantle source for the recent magmatism of Gran Canaria

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Chemical and Sr-Nd-Pb isotopic data of the Pliocene-Quaternary mafic lavas of Gran Canaria (Canary Islands, Spain) reported in Aulinas et al. (2010) are used to investigate the composition of their mantle source. The isotopic differences between the Plio-Quaternary (Post-Roque Nublo Group) and the older Pliocene (Roque Nublo Group) mafic parental magmas reflect small-scale mantle heterogeneities. Two distinct mantle components were involved in partial melting to form the Pliocene-Quaternary magmas of Gran Canaria, the first being isotopically more depleted and similar to the DMM type and the second being more radiogenic in Pb-isotope ratios comparable to an HIMU type. Geochemical variations show that the Pliocene-Quaternary mantle source is not only compositionally but also lithologically heterogeneous and supports the presence of a silica-deficient pyroxenite mantle component. Calculation of its contribution in the generation of the Pliocene-Quaternary magmas is estimated to be in the range from 50 to 70%. However, no significant differences between the Roque Nublo and the Post-Roque Nublo Groups are detected, suggesting that pyroxenite-derived melts played a similar role in both groups. Trace element ratios support mixing between the two mantle components (a silica deficient pyroxenite and a peridotite) which obscure the original chemical and isotopic compositions of these two end-members. The proposed scenario for the generation of the Pliocene-Quaternary magmas involves a lithologically heterogeneous mantle plume consisting of pyroxenite veins in a peridotite matrix which melted and mixed both mantle components during its ascent until the base of the lithosphere.

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[1] Aulinas et al. (2010) *Lithos* **119**, 377-392.

Current regulatory limitations for the development of products containing nanomaterials with a life cycle perspective

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The analysis of the specific properties of nanomaterials compared to bulk material has already received ample attention and generates research in a vast array of directions, including the design of new materials. One innovative approach is to introduce a life cycle perspective in the design of products containing nanomaterials. At the current stage of knowledge and scientific advancement, this approach includes examining the interactions between all sorts of nanomaterials and the surrounding biota during the entire life cycle of a product with an objective of designing new nanomaterials that minimize potential adverse effects.

The task of researchers is immense because of the absence of data concerning the life cycle of nanomaterials and their transformation over time. However, since the 1990s they have made significant progress in their understanding of microscopic design as well as of interactions at the nanoscale, notably concerning surface areas, and they can now envisage a true paradigm change in the management of innovation.

One important aspect of their work is that they operate in a regulatory context where the life cycle-based methodology has so far not been taken into account. After establishing a panorama of all mandatory regulatory options that frame the development of nanoproducts [1], our study aims to identify inconsistencies and gaps to fill in regulation in order to accompany this paradigm change. In other words, we seek to contribute to the development of a benchmark to foster new processes of nanomaterial design based on life cycle assessments.

[1] Claire Auplat (2012) *Global Policy* **Forthcoming**.