

From phosphors to ceramic magnets stability, crystal chemistry and applications of hexa-aluminates and -ferrites

MATTHIAS GÖBBELS

University of Erlangen-Nuremberg, Institute for Geology and
Mineralogy, Applied Mineralogy, Schlossgarten 5a.
D-91054 Erlangen, Germany

The groups of hexa-aluminates and -ferrites exhibit a wide range of applications. From lamp phosphors in the case of Ba-aluminates (Eu & Mn doped – green, Eu doped – blue luminescence) to ceramic magnets such as Sr-ferrites doped with Co and La a wide range of daily applications can be presented.

In the group of hexa-phases compounds exhibiting magnetoplumbite- and beta-alumina structures are stable. A wide crystal chemical variety gives rise to numerous properties with large potential for chemical fine tuning.

Phase relations and crystal chemical aspects like solid solution series in the multicomponent systems $\text{CaO/SrO/BaO/EuO/La}_2\text{O}_3 - \text{Al}_2\text{O}_3/\text{Fe}_2\text{O}_3 - \text{MgO/CoO}$ are presented and discussed. The crystal structures present can be explained as mixed layer structures. Starting from the spinel structural type modifications consisting of rock salt-units and perovskite-units build up the different hexa-phases.

Furthermore shaping aspects like ceramic foams consisting of Ca-aluminates aiming towards catalytic applications will be presented.

Indications for pedogenic formation of perylene in terrestrial soil: First results from stable carbon isotope ratios

TILMAN GOCHT, JOHANNES BARTH, MICHAELA EPP,
ILKA HERKLOTZ AND PETER GRATHWOHL

University of Tuebingen, Center for Applied Geosciences,
Sigwartsr. 10, 72076 Tuebingen, Germany
(johannes.barth@uni-tuebingen.de)

Concentrations and isotope compositions of polycyclic aromatic hydrocarbons (PAHs) were determined in natural soils of Southern Germany. Surprisingly, perylene concentrations increased with soil depth when compared to the other PAH compounds present, but only in specific profiles. Its low solubility made vertical transport by seepage water unlikely. We therefore stipulate atmospheric deposition of combustion-derived perylene in the top-soil and *in-situ* generation in the sub-soil of these selected profiles. This could have been caused by microbial activities or other catalytic processes yet unknown. In order to distinguish between pyrogenic and natural generation we compared compound-specific $^{13}\text{C}/^{12}\text{C}$ ratios ($\delta^{13}\text{C}$) between perylene and other PAHs in samples from the top-soil and from the sub-soil. Despite high amounts of co-extracted non-target compounds and low perylene concentrations relative to other PAHs (benzo(e)pyrene and benzo(a)pyrene) successful clean-up of the extracts led to determination of a unique $\delta^{13}\text{C}$ value for perylene in the upper horizon. The $\delta^{13}\text{C}$ value of perylene in the sub-soil was 3.4 permille more negative than for top-soil perylene, and 5.2 permille more negative than other equal-mass PAHs (with m/z of 252) in the top-soil. Future work will include isotopic characterization of atmospheric input and *in situ* synthesis of PAHs.