

Spherulites in Biological Fluids, Antioxidants and Natural Zeolites – Phenomenon and Utilization

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Abstract:

Spherulites exist in highly concentrated biological fluids such as urine, guttural, sweaty or bile secretion. Their form is similar to a disc, spherical or spheroidal particles. Lamellae, radially arranged, form a centrally situated tubular opening (a pore). In healthy people they are almost of infinite symmetry [1]. When enriched in cholesterol, spherulites undergo a structural transition - from spherulites of a curvilinear symmetry to ones of planar (crystallographic) symmetry (Fig. 1) [2]. Under stress conditions the reductive capacity of the organism is exhausted. When ascorbic acid – (vitamin C) is perorally introduced, it rapidly recovers the reduction-oxidation potential of the body. It was found that the introduction of Vitamin C results to an increased number of spherulites in the urine.

The stress disorder in the body results to increased levels of NH_4^+ in the circulating blood (NH_4^+ is very toxic to the central nervous system). The availability of natural zeolite (NZ) (with > 85% clinoptilolite) in the lumen of the gut, after peroral introduction of the mineral, adsorbs NH_4^+ , enhances the digestion and removes the discomfort in the gastrointestinal tract.

The clinoptilolite is of fine grain crystal structure with well-formed platy habitus and typical monoclinic planar, crystallographic symmetry (Fig. 2). However, there are electronic microscope images of NZ samples (a rock sample was taken at the border between clinoptilolite and mordenite deposit, where small granular spherical crystal aggregates (spherulites) can be seen of strong curvilinear (not crystallographic) symmetry (Fig. 3)*. There are a number of natural phenomenon in the area of the zeolite deposit. The spherulite located on a rock of zeolite mushrooms can be seen on Figs. 4.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

References:

1. R. I. Kostov, I. Kostov, Cryst. Res. Technol. **1989** 24, 9, 847 – 852.
2. N. Izmirova, P. Uzunov, I. Tomova, M. Baeva, ACIN 2015, Namur-Belgium, 13-17 July **2015** PP 089.

*Electronic microscope images of NZs published with the kind assistance of prof. B. Alexiev)