

The structure and composition of natural carbonaceous fullerene containing mineral shungite

Oleg Mosin¹ and Ignat Ignatov^{2*}

¹ Moscow State University of Applied Biotechnology, Moscow 119554, Russia

² Scientific Research Center of Medical Biophysics, Sofia 1111, Bulgaria

ABSTRACT

The composition and structural properties of amorphous, uncrystallized, fulleren analogues (fullerene content 0.01–0.0001% (w/w)) carbon containing natural mineral – shungite, from Zazhoginskoe deposit in Karelia (Russian Federation) are studied. There are submitted data about the nanostructure, obtained with the using of scanning electron microscopy, composition and physical chemical properties of this mineral. Also are demonstrated prospects of using shungite, possessing high absorption, catalytic and bactericidal activity, as an absorbent in water-treatment, water purification, and other industries.

Key words: shungite, nanostructure, fullerenes, water treatment, water purification

Corresponding Author: Prof. Ignat Ignatov, Scientific Research Center of Medical Biophysics, Sofia 1111, N. Kopernik St., 32, Bulgaria

1. INTRODUCTION

Shungite – the mineral of new generation of natural mineral sorbents (NMS), intermediate form between the amorphous carbon and the graphite crystal containing carbon (30% (w/w)), silica (45% (w/w)), and silicate mica (about 20% (w/w)). Shungite carbon is a fossilized organic material of sea bottom Precambrian sediments of high level of carbonization containing the fullerene-like regular structures (0.0001–0.001% (w/w)).

Shungite got its name in 1887 after the village of Shunga in Karelia (Russian Federation), located on the shore of Onezhskoe Lake, where is located the only one mineral Zazhoginsky deposit of shungites on the territory of the Russian Federation. The total shungite reserves of Zazhoginsky deposit amount to approximately 35 million tons of shungite. The plant production capacity for the mining and processing of shungites makes up 200 thousand tons of shungite per year.