

## Separated forms of sulfur in Tkibuli hard coal

*N. Takaishvili, G. Supatashvili, N. Labartkava*

E-mail: [nino.takaishvili@tsu.ge](mailto:nino.takaishvili@tsu.ge)

Department of chemistry, Chair of physical and analytical chemistry,

Iv. Javakhishvili Tbilisi State University, 3, I. Chavchavadze ave., Tbilisi

### Annotation

Construction of heat power plant with a capacity of 300 Megawatt is scheduled on the basis of Tkibuli coal. The basic controversial issue related to the project is negative ecological changes that may be caused due to functioning of Tkibuli heat power plant. Based on this fact, study of Tkibuli coal concerning the content of sulfur, chlorine, arsenic and their separated forms is a topical issue.

From the ecochemical viewpoint sulfur-containing compounds are the most undesirable coal admixtures, since sulfur dioxide originated as a result of their combustion is the main generator of acid rains.

Sulfur content in coal is limited due to negative effect on ecochemical state of the environment. According to current standards its share must not exceed 3%.

According to sulfur content Tkibuli hard coal belongs to ecologically acceptable solid fuel since its total content does not exceed 10.7 g/kg and is equal to 8.5 g/kg average. Results shown in Table indicate that 59-78% of total sulfur is present as pyrite. That is why the content of total iron and sulfur in Tkibuli hard coal correlate well with each other (correlation coefficient  $r = + 0.53$ ). As expected, content of sulfate sulfur is low (0.47-0.97 g/kg), that equals to 4-10% of total sulfur. No sulfide sulfur was observed in samples under investigation, while the content of organic sulfur changed between 14-32% of its total value.

According to sulfate sulfur and sulfur remained in ash, amount of sulfur dioxide generated as a result of combustion one ton of hard coal equals to 15-16 kg. This can be considered to be in the acceptable limits for the environment.

**Table. Content of total sulfur (g/kg) and its species  
(% from total sulfur) in Tkibuli hard coal**

Sulfur	Minimum	Maximum	Average
Total sulfur	3.0	10.7	8.5
Sulfide sulfur	0	0	0
Pyrite sulfur	59	78	70
Sulfate sulfur	4	10	8
Organic sulfur	14	32	22