

## CO-PROCESSING OF COAL AND PLASTIC WASTE: A REVIEW

Zhang Xiaobin, Denis Miroshnichenko, Alena Tulsakaya,

Elena Bogoyavlenskaya

*National Technical University*

*«Kharkiv Polytechnic Institute»*,

*Kharkiv*

The most widespread methods for the disposal of plastics are their joint coking with coal, burning with coal and the development of new composite materials. The objective of numerous researches is to explore the modification of thermoplastic properties of coal in order to assess the relevance of adding plastic waste to coal for the production of metallurgical coke [1 – 3].

There are many approaches to applying of plastic waste as a modifier of coke properties. In [4] two bituminous coals of different rank and thermoplastic properties were used as a base component of blends with plastic wastes such as high-density polyethylene (HDPE), low-density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), poly(ethylene terephthalate) (PET), and acrylonitrile-butadiene-styrene copolymer (ABS). In all cases, the addition of plastic waste led to a reduction in Gieseler maximum fluidity, the extent of the reduction depending on the fluidity of the base coal, and the amount, the molecular structure, and the thermal behavior of the polymer. The incorporation of the plastic to the carbon matrix was clearly established in semicokes produced from blends of a high-fluid coal and the plastic tested by SEM examination.

### CONCLUSIONS

Many studies are devoted to the use of coal of varying degrees of metamorphism and plastics waste. The most widespread methods for the disposal of plastics are their joint coking with coal, burning with coal and the development of new composite materials. Processes such as joint coking of coal and plastic waste have been introduced into the industry.

Due to the fact that the highest added value of products is obtained in the production of new forms of carbon polymers, it is necessary to increase the volume of research in this direction.

#### References:

1. Min Z, Cai-hong L, Lei M, Xiao-mei W, Zhi-lei Z Estimate research on co-carbonization of blend coal with waste plastics. *Procedia Earth Planet Sci*, 2009. 1. P.807–813.
2. Asanuma M, Ariyama T, Sato M, Murai R, Nonaka T, Okochi T, Tsukiji H, Nemoto K ( ) Development of waste plastic injection process in blast furnace. *ISIJ Int*, 2000. 40. P. 244–251
3. Vivero, L., Barriocanal, C., Alvarez, R., Díez M.A. Effects of plastic wastes on coal pyrolysis behaviour and the structure of semicokes, *J. Anal. Appl. Pyrolysis*, 2005. 74. P. 327–336.
4. Díez Díaz-Estébanez, Maria & Barriocanal, C. & Álvarez, R. Plastic Wastes as Modifiers of the Thermoplasticity of Coal. *Energy and Fuels*. 2005. 19. P. 2304–2316.