DETERMINING OF THE ELECTRONIC EXCITATION TEMPERATURE IN ATMOSPHERIC PRESSURE PLASMAS BY USING EMISSION SPECTRA OF METALS WITH COMPLEX LOW-RESOLVED MULTIPLET STRUCTURE

V.Ya. Chernyak[1], *I.V. Prysiazhnevych*[1],
Ok.V. Solomenko[1], *S.V. Olzewski*[1],
Ja. Diatczyk[2], *H. Stryczewska*[2],
N.V. Belenok[3], *I. Shyht*[1]

[1]Taras Shevchenko National University of Kyiv,
Radio Physics Faculty
(*2/5, Prosp. Academician Glushkov, Kyiv 03022, Ukraine; e-mail: chernyak_ v@ukr.net*),
[2]Lublin University of Technology,
Faculty of Electrical Engineering and Computer Science,
Institute of Electrical Engineering
and Electrotechnologies
(*20-618, Lublin, Poland*),
[3]National Technical University of Ukraine
"Kyiv Polytechnical Institute"
(*37, Prosp. Peremogy, Kiev 03056, Ukraine*)

S u m m a r y

Plasma parameters of a gliding arc in the argon flow are investigated by optical emission spectroscopy. It is shown that there are a lot of overlapped low-resolved multiplet lines, which correspond to the emission of electrode material, in registered spectra of the investigated plasma. To process the obtained spectra, the simulation of main stainless steel components (Fe, Cr, Ni) and their alloy (stainless steel) is made with regard for the instrumental function of a spectrometer in a wide interval of electronic excitation temperatures $T_e^* = 2000$–20000 K. Spectral intervals for the adequate comparison of experimental data with results of simulation are suggested. It is found that the ratio of concentrations of Fe and Cr atoms in the investigated plasma correlates with the content of these elements in the used electrode material (Fe$\sim$70%, Cr$\sim$20%).