ATOMIC DATA AND STARK BROADENING OF CuI AND AgI SPECTRAL LINES: SELECTION AND ANALYSIS

R. V. Semenyshyn, I. L. Babich, V. F. Boretskij and A. N. Veklich

National Taras Shevchenko University of Kyiv, Radiophysics Faculty,
Volodymyrs'ka 64, 01033 Kyiv, Ukraine

E-mail: r.semenyshyn.ua@gmail.com, babich@univ.kiev.ua, boretskij@univ.kiev.ua,
van@univ.kiev.ua

Composite materials on a base of copper and silver are widely used as electrode or contact materials in electric industry applications (e.g. relays, commutators, circuit breakers etc.). There are an insignificant number of experimental and theoretical papers, which deal with an investigation of surface condition, plasma parameters and arc discharge between such composite electrodes as well as single-component silver electrodes in the up-to-date literature. The main aim of this paper is AgI, CuI spectroscopic data selection and an investigation of plasma parameters of arc discharge between fabricated by a powder metallurgy technique composite electrodes Ag-CuO (90/10).The arc was initiated in air between the flat end surfaces of non-cooled rod electrodes. The electrode diameter was 6 mm; the discharge gap was 8 mm, the arc current were 3.5A and 30 A. The studies were realized by optical emission spectroscopy technique. Due to the spatial and temporal instability of the discharge, we used the method of one-pass tomographic recording of the spatial distribution of spectral line intensities. Fast scanning of the spatial distributions of the radiation intensities was performed using a Sony ILX526A 3000 pixel CCD linear array. Due to the instability of the discharge, the recorded spatial distributions of the radiation characteristics were statistically treated. We also took into account the no n-uniformity of the spectral sensitivity of the apparatus. Temperature radial profiles of electric arc discharge plasma were obtained using Boltzmann plot technique. For this purpose it is necessary to know the reliably examined spectroscopic data. However, there is a problem with a large variety of available in a nowadays literature spectroscopic data for these lines (transition probability, oscillator strength, stark broadening parameters etc.). Energy level populations' behavior on the Boltzmann plot was used for CuI and AgI spectroscopic data selection. In this way the selection of spectroscopic data for some of CuI, AgI lines was realized.