Abstract for ICAMDATA05, Meudon, France
October 15–19, 2006

The $4d^95p^2$ Configuration in the In III, Sn IV, Sb V and Te VI Spectra

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Domain : Other

The Ag - like ions In^{+2} - Te^{+5} have a ground state $4d^{10}5s\ ^2S_{1/2}$. Low energy levels of one electron excited states $4d^{10}nl$ are known for a long time [1]. Later the $4d^{10}5s$ - $4d^95s5p$ transitions were analyzed and the energies of the $4d^95s5p$ configuration with the electron excitation from the $4d^{10}$ core were found [2-4]. Recently (see [5] and references therein) mostly in absorption transitions from the autoionizing configurations $4d^95snl$ (n up to 11, l = p and f) and $4d^95pnl$ (n $>$ 5, l = p and f) were studied. The $4d^95p^2$ configuration up till now was not known in the Ag I isoelectronic sequence.

High resolution spectra of the elements from In through Te excited in a vacuum spark (C = 12 - 7500 μF, L = 0.75 - 25 μH, U = 0.22 - 4 kV) have been recorded in the 200 - 600 $\AA$ wavelength region. A 3 m grazing incidence spectrograph with a 3600 l/mm grating was used for the 200 - 350 $\AA$ region (plate factor respectively 0.36 - 0.45 Å/mm). In the longer region the spectrum was recorded on the 6.65 m normal incidence spectrograph with a plate factor 1.25 Å/mm. The $4d^{10}5p$ - $4d^95p^2$ transitions were identified and the energies of the $4d^95p^2$ configuration were found. The $4d^95p^2$ configuration changes its position with respect to the ionization limit $4d^{10}$ along the isoelectronic sequence. In Te VI it is located below the ionization limit whereas in In III all levels of this configurations are situated in autoionization region. The autoionization widths of the lines were observed and measured and compared with the Cowan Code calculations.

The work was partly supported by RFBR grant 05-02-08824.

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