

Abstract Submitted
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Application of coronal model for the emission properties calculations: Ti, Sc and Hg MAXIM DEMINSKY, IRINA CHERNYSHEVA, ALEXANDER ELETSKII, VALERII ASTAPENKO, BORIS POTAPKIN, Kintech Lab, Moscow, Russia — The purpose of present paper is the theoretical study of titanium atoms emission properties in Ar : Ti and Sc gas mixture under glow discharge conditions. The electronic structure of neutral Ti is extremely rich containing a large number of energy levels. For this reason it is practically impossible to develop state-to-state kinetic model, which is usually used for such kind of studies. To overcome this difficulty the model was applied, which is usually known as “coronal” model. The populations of radiative states and emission power are computed using known cross sections for the excitation of these states and transition probabilities. Electron concentration and electric field strength are determined in self-consistent manner from electron energy balance equation and given value of discharge current. In fact, the applicability and reliability of “coronal” model is not rather obvious. To clarify the situation test studies were performed for Hg atom, which has relatively simple electronic structure. The calculations were made for Ar : Hg gas mixture under glow discharge conditions using two different approaches: “coronal” model and state-to-state kinetic model. The comparison of obtained results shows that “coronal” model may be used for the quantitative estimations of the emission properties.

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