

# Thermodynamic properties of diatomic argon compounds in inductively coupled plasma

Maltsev M A<sup>1,2,@</sup>, Morozov I V<sup>1</sup> and Osina E L<sup>1</sup>

<sup>1</sup> Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia

<sup>2</sup> Moscow Institute of Physics and Technology, Institutskiy Pereulok 9, Dolgoprudny, Moscow Region 141701, Russia

@ maksim.malcev@phystech.edu

The diatomic compounds with argon atoms are poorly studied as they can hardly be observed in experiments. At the same time, their properties are of particular importance due to their appearance in the mass spectrometry with inductively coupled plasma where they may disturb signals from other ions. In order to assess the effect that these polyatomic compounds have, it is necessary to have data on concentration of compounds in plasma. One of the possible approaches to determine the ratio of argides is the thermodynamic approach. However there is no appropriate thermodynamic data on this polyatomic compounds in literature.

Previously, electronic states were studied and thermodynamic functions were calculated for a number of such compounds [1–4]. Also quantum chemical computations were conducted in order to determine electronic structure of neutral and positive argon nitride.

This work is devoted to the study of the composition of an equilibrium inductively coupled plasma. Using the obtained thermodynamic properties, the temperature dependences of the relative concentrations of the plasma composition were obtained.

[1] Maltsev M A, Morozov I V and Osina E L 2020 *High Temperature* **58** 184–189

[2] Maltsev M A, Morozov I V and Osina E L 2019 *High Temperature* **57** 335–337

[3] Maltsev M A, Morozov I V and Osina E L 2019 *High Temperature* **57** 37–40

[4] Maltsev M, Morozov I and Osina E 2016 *J. Phys. Conf. Ser.* **774** 012023