

# An Efficient Method for the Determination of Fourth Virial Coefficient with Lennard-Jones (12-6) Potential and Its Application

Bahtiyar Akber Mamedov <sup>1</sup>, Elif Somuncu <sup>2</sup>, Iskender M. Askerov <sup>3</sup>

<sup>1</sup> *Department of Physics, Gaziosmanpasa University, Tokat, Turkey*  
*E-mail: bamamedov@yahoo.com*

<sup>2</sup> *Department of Physics, Giresun University, Giresun, Turkey*  
*E-mail: elf\_smnc@hotmail.com*

<sup>3</sup> *Department of Physics, Giresun University, Giresun, Turkey*  
*E-mail: iskender.askeroglu@giresun.edu.tr*

**Abstract:** In this work, a new theoretical approach is proposed for calculating fourth virial coefficient with Leonard-Jones potential(12-6). The established algorithm can be used to evaluate the thermodynamics properties and the intermolecular interaction potentials of liquids and gases with an improved accuracy. Note that the evaluation of the high-order virial coefficients is very valuable for accurate calculation of thermodynamic parameters. By using the suggested method, the fourth virial coefficient of  $CH_4$ ,  $Ar$ ,  $C_2H_6$  and  $SF_6$  molecules are evaluated. The calculation results are useful for accurate interpretation of the experimental data and of the determination of related physical properties [1].

**Keywords:** Virial equation of state, Fourth virial coefficient, Lennard-Jones (12-6) potential

**PACS No:** 51.30.+i, 05.10.-a

## REFERENCES

- [1] Dyer, M. K., Perkyns, J. S., Pettitt, B. M., "A reexamination of virial coefficients of the Lennard-Jones fluid Theoretical Chemistry Accounts", Theor. Chem. Acc., Vol. 105, pp. 244-251, 2011.