Necessary and sufficient conditions for the existence and uniqueness temperature of Boyle and Joule-Thomson, the volume of Boyle and the inflection point of the second virial coefficient

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Laboratory Simulation. Federal State Budget Institution "Institute of Thermophysics of SB RAS".
Lavrentieva Pr., 1. Novosibirsk, 630090. Russia. Tel: +7 (383) 354-20-17. E-mail: tepliza@academ.org

Abstract
The necessary and sufficient conditions were found that are imposed on the spherically symmetric interaction potential that existed the Boyle temperature and Joule-Thomson, the volume of Boyle and the inflection point of the second virial coefficient. The uniqueness of temperatures of Boyle and Joule-Thomson, the volume of Boyle and the inflection point of the second virial coefficient of volume were proved. It is proved that the second virial coefficient has no point touches the temperature axis at finite temperature.