

Pritisak faznog prelaza u planetama Jupiterovog tipa

Cilj ovog rada je da se utvrdi da li vrednost pritiska faznog prelaza smeše gasovitog vodonika i helijuma u metalni zavisi od njihove koncentracije u planetama Jupiterovog tipa. Pri radu je korišćena teorija Savić-Kašanin (SK), na osnovu koje se može odrediti pritisak faznog prelaza u smešama sa različitim relativnim udelom vodonika i helijuma.

Za različite koncentracije smeše vodonika i helijuma računati su pritisci faznog prelaza i ustanovljeno je da pritisak ne zavisi od zastupljenosti određene smeše u unutrašnjosti planeta džinova i da iznosi 4.1 ± 0.4 Mbar. Vrednost pritiska faznog prelaza koja proizilazi iz ovog semiklasičnog pristupa ne odstupa bitno od rezultata nekih savremenijih modela. Tako, na primer, Hubbard i Morley navode da na mestu faznog prelaza smeše vodonika i helijuma, vlada pritisak od 5 Mbar (Hubbard W. B. and Marley M. 1989. Optimized Jupiter, Saturn and Uranus Interior Models. *Icarus*, **78**: 102).

Može se zaključiti da je SK teorija primenljiva za modeliranje i opisivanje unutrašnjih procesa u telima kao što su velike planete.

Phase Transition Pressure in Jovian Planets

The aim of this work was to determine if there is dependence between gas-metal phase transition pressure of hydrogen and helium mixture and their concentration in Jovian planets. We used the Savić-Kašanin (SK) theory to determine the phase transition pressure of this mixture with different relative concentrations of the elements.

The phase transition pressures were calculated for different concentrations of the hydrogen and helium mixture and we found that there is no dependence of pressure on the portion of a certain mixture in the giant planets' interior and that it is a constant 4.1 ± 0.4 Mbar. The value of the phase transition pressure which is calculated by this semi classic approach does not differ significantly from the results of some more contemporary models. For example, Hubbard and Morley state that the pressure at the point of phase transition of the hydrogen and helium mixture is 5 Mbar (Hubbard W. B. and Marley M. 1989. Optimized Jupiter, Saturn and Uranus Interior Models. *Icarus*, **78**: 102).

We conclude that the SK theory can be used to model and describe internal processes of bodies such as giant planets.

Kristina Savić (1989), Čurug, Cara Dušana 93, učenica 3. razreda Gimnazije u Bečeju

MENTOR: dr Vladan Čelebonović, Institut za fiziku, Zemun