

ABSTRAK

PENGUKURAN NILAI KONSTANTA BOLTZMANN MENGGUNAKAN GAS KARBON DIOKSIDA BERDASARKAN PERSAMAAN UMUM GAS IDEAL

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Penelitian pengukuran nilai konstanta Boltzmann menggunakan gas karbon dioksida berdasarkan persamaan umum gas ideal telah dilakukan. Nilai konstanta Boltzmann didapatkan dengan menganalisis grafik hubungan tekanan terhadap jumlah molekul gas karbon dioksida dalam sistem tertutup. Nilai konstanta Boltzmann juga didapatkan dengan menganalisis grafik hubungan tekanan terhadap perubahan suhu gas karbon dioksida dalam sistem tertutup yang dipanaskan. Kedua grafik dianalisis menggunakan aplikasi *Logger Pro* dan perhitungan sehingga didapatkan nilai konstanta Boltzmann. Nilai konstanta Boltzmann yang diperoleh dengan menganalisis hubungan tekanan terhadap jumlah molekul gas karbon dioksida dalam sistem tertutup adalah $(1,5 \pm 0,1) \times 10^{-23}$ J/K. Nilai konstanta Boltzmann yang diperoleh dengan menganalisis hubungan tekanan terhadap perubahan suhu gas karbon dioksida dalam sistem tertutup yang dipanaskan adalah $(1,2 \pm 0,4) \times 10^{-20}$ J/K, hal ini terjadi karena persebaran data yang tidak merata dan terdapat variabel yang tidak dapat diukur.

Kata kunci: konstanta Boltzmann, persamaan umum gas ideal, dan gas karbon dioksida.

ABSTRACT

A MEASUREMENT OF THE VALUE OF THE BOLTZMANN CONSTANT WITH CARBON DIOXIDE GAS BASED ON THE UNIVERSAL IDEAL GAS EQUATION

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Boltzmann constant value measurement research using carbon dioxide gas based on the general equation of ideal gas has been carried out. The Boltzmann constant value is obtained by analyzing the graph of the pressure relationship to the number of carbon dioxide gas molecules in a closed system. The Boltzmann constant value is also obtained by analyzing the graph of the relationship between pressure and temperature changes of carbon dioxide gas in a closed system that is heated. Both graphs are analyzed using the Logger Pro application and calculations so that the Boltzmann constant value is obtained. The Boltzmann constant value obtained by analyzing the relationship of pressure to the number of carbon dioxide gas molecules in a closed system is $(1.5 \pm 0.1) \times 10^{-23}$ J/K. The value of Boltzmann's constant obtained by analyzing the relationship of pressure to temperature changes of carbon dioxide gas in a heated closed system is $(1.2 \pm 0.4) \times 10^{-20}$ J/K, this occurs due to uneven distribution of data and there are variables that cannot be measured.

Keywords: Boltzmann constant, general equation of ideal gas, and carbon dioxide gas.