A MICROMETHOD FOR TOTAL SULFUR DETERMINATION IN NONLEADED LIGHT HYDROCARBON FEEDSTOCKS

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ABSTRACT

Sulfur poisoning adversely affects the life and performance of nickel catalysts used in hydrocarbon reforming and similar operations. The need for a dependable procedure for total sulfur determination led to development of the method described in this paper. The sulfur compounds in a weighed sample are converted to SO_2 by combustion in an oxyhydrogen burner, and oxidized to SO_3 by passage of the combustion products through a hydrogen peroxide solution. An aliquot of the washings is then reduced to H_2S in a solution of hydriodic acid. The resulting H_2S is converted to methylene blue for colorimetric measurement; at the acid concentration used in this method, methylene blue has two absorption peaks: 670 and 745 mμ. The method is so sensitive that 2 μg of sulfur in a 100 cc volume yields a perceptible color development. By adjusting the amount of sample taken, or the aliquot of sulfate solution, one can determine sulfur levels in the range of 0 to 500 ppm by weight. The only limitation is contamination of low-sulfur samples if the apparatus is not thoroughly rinsed and cleaned after use with high-sulfur samples. Interferences are from metals such as Ca, Ba, and Pb, which cause insoluble sulfates.