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THERMAL ANALYSIS OF HUMAN HAIR IN NON-ISOTHERMAL AND ISOTHERMAL CONDITIONS

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Abstract: *This paper presents the thermogravimetric analysis of four (European) human hair samples under non-isothermal and isothermal conditions, in air. The thermal stability of these samples was evaluated using the following criteria: T_{onset} - the initial temperature at which the thermal degradation starts and apparent activation energy for this stage. The European hair type was determined to have more thermal stability. Therefore, if T_{onset} the temperature at which their thermal decomposition starts was compared with that obtained by other researchers in similar conditions for three types of human hair (Caucasian, Oriental and African), values 30 up to 70℃ higher would be established. Thermal resistance tests run in isothermal conditions (230℃, for 1 minute) established that only the P1 sample (dyed coarse hair) showed percent mass loss bellow 1%. For this sample, the thermogravimetric data, as well as the kinetic data confirmed a better thermal stability.*

Keywords: thermal stability, human hair, dynamic and isothermal conditions.

1. Introduction

Heat is frequently used to dry, straighten or curl hair in beauty salons, but also at home. The majority of existent studies from the literature on thermal analysis of human hair are conducted under dynamic conditions with various heating rates and in air or inert gas [1-5].

In a recent study, C. R. R. C. Lima et al. [4] used the following techniques: thermogravimetry (TG), derivative thermogravimetry (DTG) and differential scanning calorimetry (DSC) to analyze thermal stability of animal keratin and three types of human hair (Caucasian, Oriental and African). The conducted study established that the African hair had the lowest thermal stability. This pattern is due to this type of hair having a lower content of main constituent elements (C, N, H and S) of the capillary matrix. The Caucasian hair type thermal stability was also analyzed in dynamic conditions by R. M. da Gama et al. [4] with a view to

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