

A Study of Asphalt Binders by X-ray Diffraction Using Pearson-VII, Pseudo-Voigt and Generalized Fermi Functions (M.Sc. thesis presentation)

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ABSTRACT: Asphalt binder from twenty-three samples were obtained from Northern Ontario, Alberta from Canada Montana USA, and Venezuela. Structural studies of asphalt in crude oil have been performed by X-ray diffraction (XRD). The XRD spectra were taken with a Rigaku Dmax 2200V/PC, and Jade TM software was used for initial analysis. XRD implementation with Cu-K- radiation operating at 40 KV and 40 mA, with a scan rate of $0.001^\circ 2\theta$ per second. The XRD data were fitted with (Pearson VII, Pseudo-Voigt) profiles, and then modeled in Mathematica using a Generalized Fermi Function (GFF).

The results are discussed in terms of their accuracy with different combinations of backgrounds such as (Linear, Level, Fixed, Parabolic, 3rd order Polynomial, 4th order Polynomial). In addition, the fits also include various parameters, for example, Threshold Sigma, Intensity Cutoff, Range to find background, Exponent, Skewness and Lorentzian.

ALL ARE WELCOME!