

USE OF LOW ENERGY BETA RADIATION TO IDENTIFY
DOCUMENT FORGERIES AND
COUNTERFEIT CURRENCY NOTES

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The interaction of low energy beta (β) radiation with matter is solely with the electrons in the interacting material and therefore the amount of β rays absorbed when a beam passes through an object is related to the number of electrons encountered. The number of electrons encountered is proportional to the superficial density of the interacting material. Beta rays can reduce photographic emulsions and therefore β ray intensities can be measured by measuring the optical densities of the impressions produced on a photographic plate.

When carbon-14 β rays from a sheet source is made to pass through a sheet of paper the penetration pattern of the β rays through the paper can be registered on a photographic plate by sandwiching the paper between the sheet source and the photographic plate and processing the photographic plate after a period of exposure. Tydeman¹ found that when low energy β rays pass through thin sheets of cellophane and produce an impression on a photographic plate, the optical density of the photographic impression is logarithmically related to the total mass of the material encountered along their path of transmission. Stevenson² used the superficial density differences placed on paper by introducing water marks to obtain photographic impressions of water marks by this method and used them to date important documents.

In the present work this method was developed to obtain photographic impressions of alterations made on documents and decipher such altered figures.

The same method was extended to examine pulp distribution patterns in currency notes and artifacts introduced in the process of making counterfeit currency notes. Printing on currency notes by the intaglio method of printing can be examined by this method.

References:

1. Tydeman, P.A. (1967) - The Paper Maker, June p42
2. Stevenson, A (1968) Nature, Vol.218, May 18 p 620