

RANI CHANNAMMA UNIVERSITY BELAGAVI



Gokak Education Society's

J.S.S ARTS, SCIENCE AND COMMERCE COLLEGE

GOKAK



A PROJECT REPORT ON

**“DETERMINATION OF LINEAR AND MASS ATTENUATION
COEFFICIENT OF BETA SOURCE USING PLASTIC AS AN
ABSORBER”**

**SUBMITTED IN A PARTIAL FULFILLMENT OF REQUIREMENT
FOR**

THE AWARD OF THE DEGREE IN

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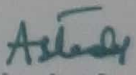
CERTIFICATE

This is to certify that the dissertation entitled “**DETERMINATION OF LINEAR AND MASS ATTENUATION COEFFICIENT OF BETA SOURCE USING PLASTIC AS AN ABSORBER.**” has been carried out by Miss. Aishwarya B Nirwani (PH201201), Miss. Shivani .S. Pattanshetti (PH201211), Miss. Shweta .S. Telasang (PH201212), Miss. Vijayashree .G. Hiremath (PH201214).

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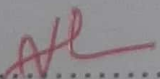

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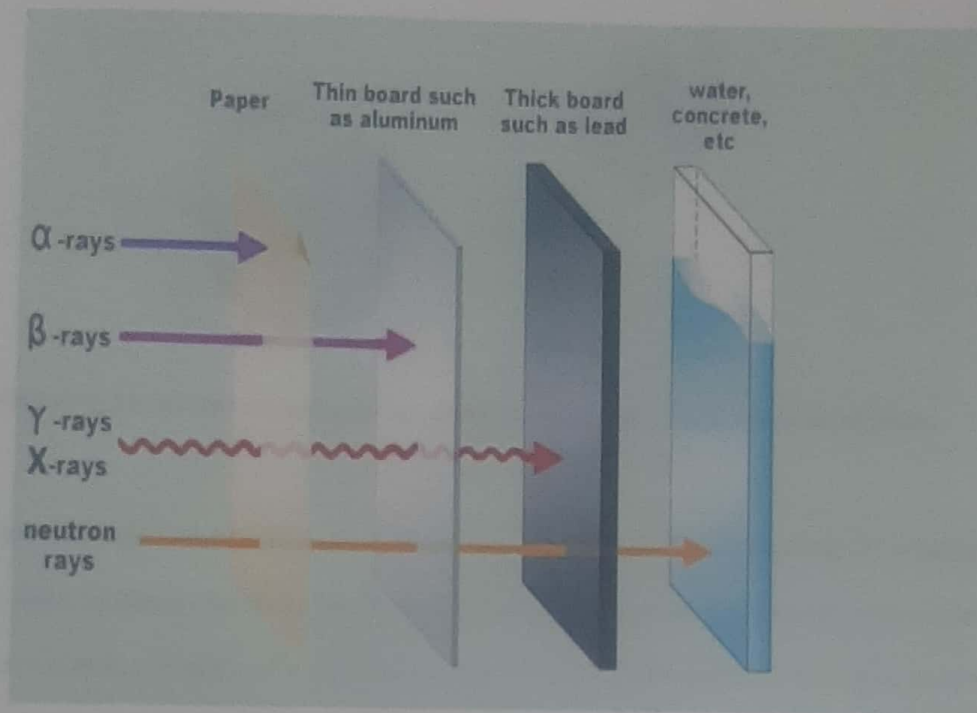


Figure 1.2 (a) Types of Ionizing radiations

Type	Symbol	Nature	Charge	Relative Mass	Range in Air	Penetration
alpha	α	particulate (helium nucleus)	++	4	0.4 - 2 cm	None
beta	β	particulate (electron)	-	1/1800	5-20 cm	Slight
neutron	n	particulate (neutron)	0	1	long	High
gamma	γ	electro-magnetic	0	0	v.long	High
x-ray	χ	electro-magnetic	0	0	v.long	High

Table 1.2 (b) Basic properties of ionizing particles.

2.1.1 CONSTRUCTION OF GM COUNTER

The GM tube consists of 'E' a metal tube with glass envelope along as the cathode & a fine wire along the axis of the tube which acts as anode. The tube is well insulated from the anode wire.

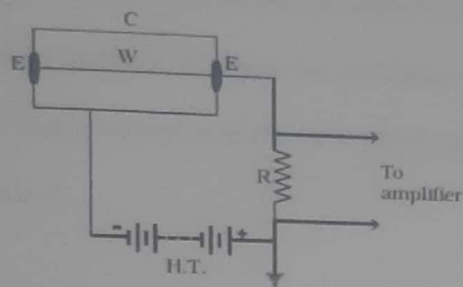


Figure 2.1.a : Construction of G.M.Counter.

The tube is filled with an inert gas like Argon at a low pressure. One end is fitted with a thin mica sheet through which radiation enters the tube a high potential difference of about 1000V is applied between the electrodes through high resistance of about 100Mohm.

2.1.2 : WORKING OF GM COUNTER:



Figure 2.1 (b) G.M.Counter

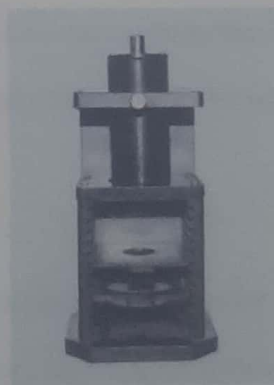


Figure 2.1 (c) Source Holder

3.5 Comparison of linear and mass attenuation coefficient of Strontium source using various material as an absorber.

Table 3.5 (a) Linear and mass attenuation coefficient for strontium using oil as an absorber.

Different absorber	Density (g/cm ³)	Linear attenuation (cm ⁻¹)	Mass attenuation (cm ² /g)
Coconut Oil	0.924	1.50175	1.6252
Almond Oil	0.910	2.23912	2.4605

Comparing the above linear and mass attenuation coefficient values of strontium source using oil as an absorber to our experimental values. Where we used plastic as an absorber.

Table 3.5 (b) : The obtained linear and mass attenuation coefficient for strontium using plastic as an absorber.

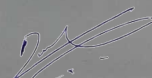
Absorber	Density (g/cm ³)	Linear attenuation (cm ⁻¹)	Mass attenuation (cm ² /g)
PET	1.38	5.54	4.014
HDPE	0.97	5.29	5.045
PVC	1.38	5.4	3.913
PP	0.905	3.59	3.966

Here we can observe that linear and mass attenuation coefficient of plastic as an absorber shows maximum values compare to linear and mass attenuation coefficient of oil as an absorber.

CHAPTER - IV CONCLUSION

We conclude that β - source being medium energy. We consider four type of absorbers and calculated linear and mass attenuation coefficient of them. Linear and mass attenuation varies on the basis of the absorbing materials composition. And mass attenuation coefficient depends upon the density of the material.

- We have measured linear and mass attenuation coefficient of four different types of plastic materials as an absorber.
- It observed that as counts increases absorption decreases. As absorption decreases linear attenuation also decreases.
- It means that count is inversely proportional to the absorption and linear attenuation coefficient.
- And in our experiment it is noted that PET (Polyethylene terephthalate) shows maximum linear coefficient i.e. 5.54 cm^{-1} where as PP (polypropylene) shows least linear attenuation coefficient i.e 3.59 cm^{-1} compare to other three studied plastic.
- It indicates that PET can act as better absorber than other three studied plastic materials.
- As we studied the properties of PET and PP we know by these properties, which absorbers more and which absorbers less. By studying their properties, we can synthesis the new kind of plastic.


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