THE ATOMIC WEIGHT OF LEAD

Katanga Pitchblende

Wt. of $PbCl_2$ in vacuum g.	Wt. of Ag in vacuum g.	Ratio $PbCl_2$: 2Ag	At. wt. of Pb.
4.57229	3.56261	1.28341	206.00
6.20083	4.83143	1.28344	206.00
4.45462	3.47094	1.28340	205.99
	Average	1.28342	206.00
	Katanga Pitchblende Extract		
2.62575	2.04615	1.28326	205.96
3.75342	2.92474	1.28333	205.98
3.28347	2.55867	1.28327	205.96
3.19222	2.48745	1.28333	205.98
	Average	1.28330	205.97
	Bedford Cyrtolite		
0.59044	0.46015	1.28315	205.94
	Common Lead		
2.56818	1.99234	1.28903	207.21
4.34481	3.37050	1.28907	207.22
	Average	1.28905	207.21

posed of the isotopes Pb^{206} and Pb^{207} in the proportions of 14 to 1. From this evidence the isotopic weight of Pb^{206} would seem to have the surprisingly low value 205.90–205.93.

It is difficult to explain the difference in the atomic weights of the lead from the black and yellow portions of the original mineral. If the veins were formed by infiltration, an external source of lead of atomic weight 205.97 is required. If, as seems more probable to us, the yellow material is an alteration product, it might indicate a different rate of decay of uranium isotopes, as v. Grosse has recently proposed.[4] But since then the yellow material must contain on an average older lead than the black, this hypothesis would require a higher rate of decay for U^{238} than for U^{239}, a conclusion which is contrary to v. Grosse's.

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FREE POSITIVE ELECTRONS RESULTING FROM THE IMPACT UPON ATOMIC NUCLEI OF THE PHOTONS FROM TH C″

THE discovery of the fact that free positive electrons are present among the secondary particles resulting from the disruption of nuclei by the cosmic radiation,[1] together with various kinds of evidence that the primary cosmic radiation at sea-level consists largely of photons, made it appear of value to study the hard γ-rays of natural radioactive substances for similar effects. Experiments have been carried out which gave conclusive evidence that positrons[2] are ejected from lead by the γ-radiation of Th C″.

Near the bottom of a vertical Wilson cloud-chamber operating in a magnetic field of about 400 gauss a plate of lead was placed through which a collimated pencil of γ-rays from Th C″ was allowed to pass. About 5 cms above the lead was inserted an aluminum plate of 0.5 mm thickness for the purpose of differentiating between particles of positive and negative charge, a method previously used by the author and later by Blackett and Ochialini for the same purpose.

Out of 1,500 exposures three photographs were obtained, each one of which showed a positron ejected from the lead, the direction of ejection being nearly in the direction of the incident γ-ray beam. The positrons penetrate the aluminum plate and emerge with an appreciably lower energy; in all three photographs the tracks cross practically the whole chamber, and their curvatures are readily measurable and of the right order of magnitude. The general indications are that the positrons are not very rare among the electrons ejected from the lead.

These photographs offer unambiguous evidence that photons when absorbed by nuclei do eject both positive and negative electrons quite in accordance with the evidence which has appeared in cosmic-ray studies. Further, many of the tracks which we have obtained from the γ-rays of Th C″ resemble the showers such as those obtained by us[3] and particularly emphasized in the photographs of Blackett and Ochialini.[4]

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METHOD OF EXTRACTION OF SUPRARENAL CORTICAL HORMONE-LIKE SUBSTANCE FROM URINE

IN view of the physiological significance of the possible presence of a substance in the urine that raises the resistance of suprarenalectomized rats to histamine poisoning,[1] the exact method of extraction of this substance is given below:

[4] *Phys. Rev.*, 42: 565, 1932.
[1] SCIENCE, 76: 238, 1932.

[2] The contraction positron is here used to denote the free positive electron.
[3] C. D. Anderson, "Cosmic-Ray Bursts," *Phys. Rev.*, 43: 5, 368, March 1, 1933.
[4] *Proc. Roy. Soc.*, 139, 699, 1933.
[1] D. Perla and J. Marmorston-Gottesman, *Proc. Soc. Exp. Biol. Med.*, 28: 1024, 1931.