

Research Notes.

New Data on Isotopes.

SINCE the binding energies of nuclei can be estimated from their mass defects, the importance of accurate values of the atomic weights of the isotopes of elements need not be laboured. Great interest therefore attaches to the new work of Aston with his improved new mass-spectrograph. His values for the atomic weights of the proton, the neutron, helium and carbon have already been quoted in these columns. In *Nature*, 1936, **137**, 613, he has reported the results of new measurements carried out by him. Great accuracy has been obtained by comparing pairs of particles of almost the same mass—the so-called doublets such as N, CH₂; F, HDO; Ne, D₂O etc. The following are his results:—

Symbol	Packing Fraction	Isotopic Weight
¹⁰ B	16.1	10.0161 ± 0.0003
¹⁴ N	5.28	14.0073 ± 0.0005
¹⁹ F	2.36	19.0045 ± 0.0006
²⁰ Ne	-0.70	19.9986 ± 0.0006
²⁷ Al	-3.3	26.9909
²⁸ Si	-5.0	27.9860
²⁹ Si	-4.7	28.9864 ± 0.0008
⁴⁰ A	-6.15	39.9754 ± 0.0014

He has also revised the isotopic constitution which he had previously given in the case of a few elements. These are:

Cd:	Mass numbers ..	..	106	108	110	111	112	113	114	116		
	Abundance ..	..	1.5	1.0	15.6	15.2	22.0	14.7	24.0	6.0		
Sn:	Mass numbers ..	..	112	114	115	116	117	118	119	120	122	124
	Abundance ..	..	1.1	0.8	0.4	15.5	9.1	22.5	9.8	28.5	5.5	6.8
Pb:	Mass numbers ..	..	204	206	207	208						
	Abundance ..	..	1.0	28.3	20.1	50.1						

The other previously given isotopes of Pb are regarded as doubtful.

He considers that Fe 58 and Ni 64 found by Zeeman and de Gier by the parabola method no doubt exist, whereas Ni 61 observed by them seems to present a conflict with his own results. He also regards that Nd 148 and 150 recorded by Dempster are real isotopes, in which case, as he points out, the discrepancy between the chemical atomic weight and the mass spectrograph value may disappear.

T. S. S.

Thixotropic Gels.

GELS which can be converted into sols by applying a suitable mechanical stress, e.g., by

shaking, and set to gels again at a definite rate when the stress is removed are known as thixotropic gels. The actual transition in such a system from sol to gel or *vice versa* is not in general accompanied by a change in volume, and the average distance between the constituent particles must therefore be the same in the sol and the gel. Under the circumstances it is interesting to enquire how the rigidity has developed in a previously fluid sol. A widely accepted explanation is that the particles in the gel are surrounded by thick envelopes of oriented water molecules or "lyospheres", and that these envelopes are destroyed by shaking, and reform on allowing to stand. When these spheres are large enough to make contact with each other the sol becomes rigid. Such an explanation is however not very convincing, and in the May number of the *Proceedings of the Royal Society*, J. L. Russel and E. K. Rideal have advanced an alternative theory that thixotropic gelation is due to oriented coagulation of the highly dispersed anisotropic material which is usually contained in such gel materials. In such a sol system on the gradual addition of an electrolyte a point will be reached where adhesion will occur when two particles come together at a particular orientation with respect to each other, but not if they collide in any other way. Any stress which

tends to destroy the orientation destroys the structure. With higher electrolyte concentrations, random coagulation will occur and irregular flocks will be formed.

Eloxal and the Seo Photo Process.

DR. ALEXANDER JENNY describes in *Forschungen und Fortschritte* (12, No. 5, 69) the new SEO (Siemens-Electro-Oxidation) process in Photography. The process consists essentially in covering a plate of Aluminium with a surface film of its oxide by oxidising the metal electrolytically in an acid medium. The thickness of the oxide layer is of the order of 2 to 20 μ.

(Continued on page 889.)