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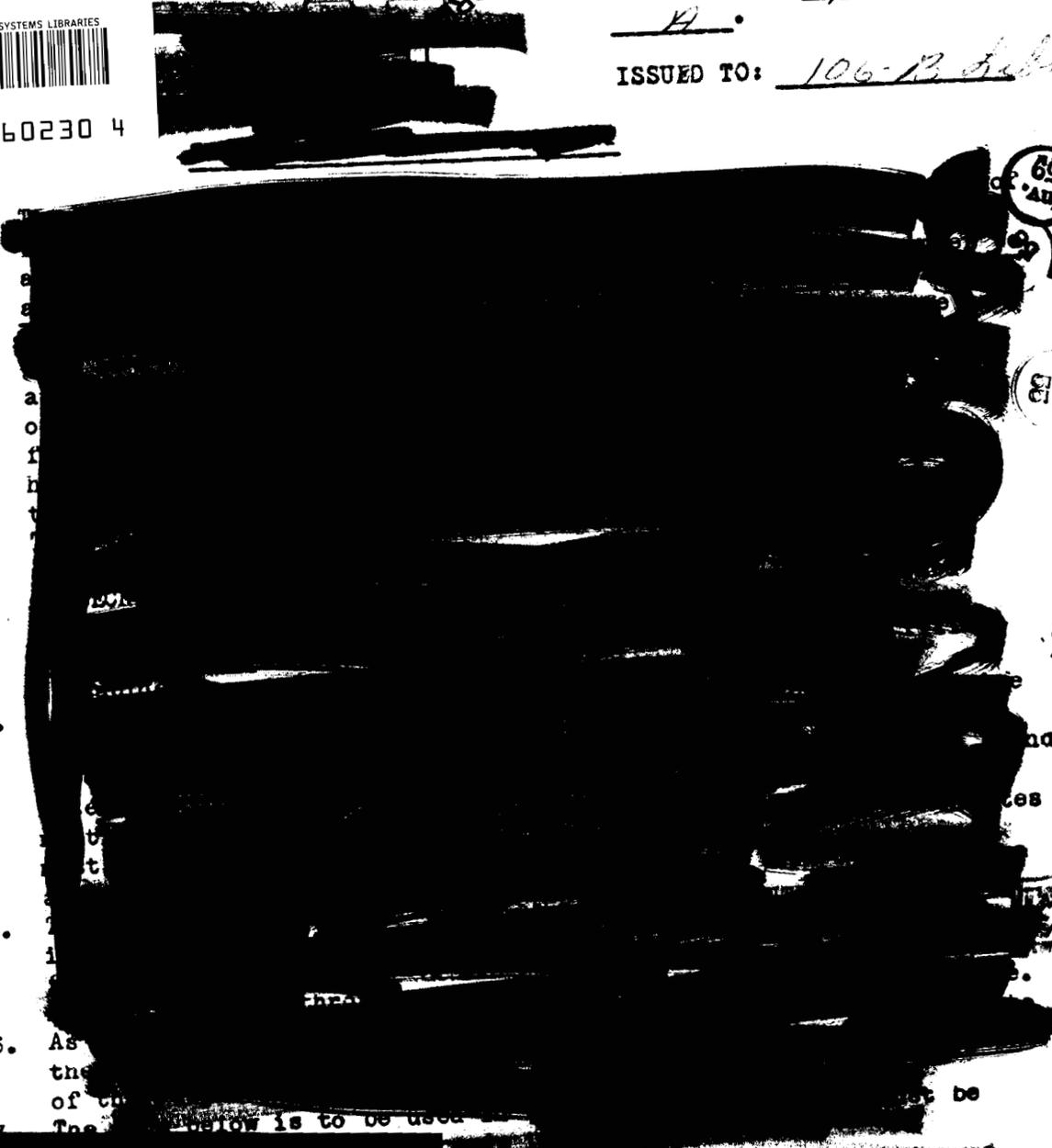
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March 10, 1948

ABSTRACTS OF REPORTS ADDED TO THE LIBRARIES
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by

W. H. Bridges

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ABSTRACTS OF REPORTS ADDED TO THE LIBRARIES
FOR THE WEEK ENDING MARCH 5, 1948

ADMINISTRATIVE REPORTS

- HW-8894 BIWEEKLY LIST OF ADDITIONS TO THE 300 AND 700 AREA CLASSIFIED FILES January 2, 1948 - January 13, 1948
Hanford Engineer Works February 20, 1948 12 pages (Secret)

CHEMISTRY REPORTS

- UCRL-25 THE THERMODYNAMICS OF GASEOUS CUPROUS CHLORIDE MONOMER AND TRIMER
Leo Brewer and N. L. Lofgren January 2, 1948 41 pages (Restricted)

The existence of a trimeric molecule, Cu_3Cl_3 , in cuprous chloride vapors was disclosed as a result of measurements of volatility of cuprous chloride in hydrogen-hydrogen chloride mixtures over copper metal. This conclusion was verified by vapor density measurements at 1119°K with pure cuprous chloride. At the boiling point of liquid cuprous chloride, 1632°K at 1 atm., the monomeric partial pressure is only 11%.

In the cuprous bromide and iodide systems evidence was found for the existence of polymer molecules in the vapor, but the actual polymer number was not evaluated.

The heats of formation of the various species at 1300°K and under standard conditions from the elements were found to be: $\text{CuCl}(\text{g})$, $\Delta H_{1300^\circ\text{K}} = 18.8 \pm 4$ kcal; $\text{Cu}_3\text{Cl}_3(\text{g})$ $\Delta H_{1300^\circ\text{K}} = -63.1 \pm 2$ kcal.; and $\text{CuBr}(\text{g})$, $\Delta H_{1300^\circ\text{K}} = 23.3 \pm 1.2$ kcal. The D_0 values calculated from the thermal data were 3.80 ± 0.15 and 3.42 ± 0.15 volts for $\text{CuCl}(\text{g})$ and $\text{CuBr}(\text{g})$ respectively. Free energy equations are given for both cuprous chloride molecular species.

- UCRL-49 THE ESTIMATION OF HEATS OF FORMATION
Leo Brewer February 2, 1948 13 pages (Restricted)

The procedure for estimation of heats of formation of compounds is illustrated by discussion of compounds of several of the elements of the actinide series. The procedure is particularly suited for lanthanide and actinide elements because of the similarity of the ionic radii and types of bonding.

[REDACTED]

HEALTH AND BIOLOGY REPORTS

UR-4

THE TOXICITY OF URANIUM HEXAFLUORIDE FUME IN ANIMALS EXPOSED FOR ONE YEAR TO 0.05 and 0.2 mg U/m³, RESPECTIVELY
C. J. Spiegl March 3, 1948 69 pages (Restricted)

Groups of animals were exposed to the fumes of UF₆ in air in order to evaluate chronic toxicity and to estimate a "maximal tolerated concentration". One month was used for acclimatizing the animals and for establishing control biochemical values. For the next successive 12 months, 21 dogs, 185 rats and 16 rabbits were exposed to 0.2 mg U/m³; 17 dogs, 179 rats and 30 guinea pigs to 0.05 mg U/m³. Rabbits and guinea pigs were studied during only the last 9 months. Daily exposure in both studies lasted 6 hours, except for alternate Saturdays.

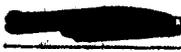
Only borderline toxicity was produced by 0.2 mg U/m³ and almost no effects by 0.05 mg U/m³. Mortality of all species was 14.3% and below that of a similar control group. Exposed dogs showed small weight losses but quickly returned to normal. Although the frequency of elevated blood nonprotein nitrogen levels as well as abnormal urinary protein and amino acid to creatinine ratios in dogs and in rabbits was greater than among controls; these deviations occurred at random throughout the year. Hematologic changes in dogs and rats were not significant.

Exposure to UF₆ at 0.2 mg U/m³ produced slight but definite changes in the prothrombin clotting time and blood fibrinogen levels of dogs, rats and rabbits, although no pathologic changes were found in the liver. Mild renal tubular injury was produced in 12 of 14 dogs within 10 days, and in 55% of the rabbits and 16% of the rats, respectively. Fluoride, but not uranium, was found to deposit in the bones of rats. Alveolar bone changes were pathognomonic of fluorosis although dental studies of incisors showed only slight pigmentary changes. Except for 2 of 17 dogs and 1 of 141 rats, there was no evidence that 0.05 mg U/m³ produced any morphologic changes.

UR-5

PHOSPHATASES IN THE CELL SURFACE OF LIVING YEAST CELLS
A. Rothstein and Rebecca Meier January 6, 1948 31 pages
(Restricted)

In connection with studies of inhibition of glucose metabolism by uranium, it was found that yeast cells hydrolyze adenosine triphosphate (ATP) added to the medium. The products of hydrolysis, inorganic phosphate and adenylic acid and the residual ATP could be recovered quantitatively in the medium. When ATP containing radioactive phosphorus (P³²) was used, none of the P³² was found in the cells even though 90% of the labile phosphate of the ATP was hydrolyzed, indicating that



the hydrolysis was not occurring inside the cell. Because no ATP-ase activity was ever found in the cell-free medium, it must be concluded that this enzyme is on the cell surface of the yeast.

A number of the characteristics of the enzyme were determined. The pH optimum was 3.4, the ATP concentration necessary for optimum rate of hydrolysis was 0.4×10^{-3} M. The K_m (Michaelis constant) was 1.6×10^{-4} and V_m (maximal velocity) was 0.087 micromols/10 min./mg of yeast. With an excess of substrate the hydrolysis was a first order reaction (rate proportional to enzyme concentration). The rate of hydrolysis decreased markedly with time, despite the presence of ample substrate. The decrease in rate was not due to enzyme inactivation, but was associated with inhibition by the products of hydrolysis.

Other phosphorylated compounds such as adenosine diphosphate, inorganic triphosphate, inorganic pyrophosphate, Na glycerophosphate and Na phenyl phosphate were also hydrolyzed by the yeast cells. Differences in pH activity curves for these different substrates, and competition experiments between pairs of substrates suggested that several enzymes might be involved.

It is interesting to note that in addition to the ATP-ase, ATP also seems to be present on the cell surface as indicated by studies of the mechanism of uranium inhibition of glucose metabolism.

UR-6

THE RELATION OF PARTICLE SIZE OF URANIUM DIOXIDE DUST TO TOXICITY FOLLOWING INHALATION BY ANIMALS
H. B. Wilson February 12, 1948 33 pages (Restricted)

The relation of particle size to toxicity of uranium dioxide dust following inhalation by animals has been determined in 2 parallel studies. In both studies, 16 rabbits and 24 rats were exposed to UO_2 dust as approximately 80 mg/m^3 . In the first experiment, the mass median (M_g) particle size was 0.45μ . In the second experiment at the same dust concentration, the UO_2 had a mass median particle size above 1μ . The size fractions were prepared by sedimentation methods. The dusty atmospheres were produced by means of an aspirator feed that developed an aerosol from a water suspension of UO_2 . Collection of Cascade Impactor samples each day permitted a close check on particle size variation. The filter paper dust sampler was used to determine concentration. Particles from the "fine" suspension were found to have a total surface area ten times that of the particles in the "coarse" suspension, the difference resulting largely from the difference in particle size.

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In the rabbit, a) proteinuria, b) elevation of urinary amino acid N- creatinine ratio and c) elevation of blood NPN occurred in both experiments but was significantly greater at 0.45 μ particle size. Renal pathology in the rabbit was about the same in both studies. In the rat, however, slight but definite renal damage was observed in nearly all animals exposed to UO₂ of 0.45 μ size, whereas practically none was observed in rats exposed to the larger particle sizes. Appreciable lung damage occurred in rats from the 0.45 μ particles; none from the particles of M_g greater than 1 μ . Retention of UO₂ in the lung in both species was 2-5 fold greater at the smaller particle size than at the larger. Accumulation of UO₂ in the kidney and femur was only one thousandth that in the lung. Differences related to particle size were less clear cut here.

UR-7

URANIUM TETRAFLUORIDE - TWO 1 YEAR INHALATION TOXICITY STUDIES at 3.0 and 0.5 Mg/m³

Aser Rothstein March 1, 1948 45 pages (Restricted)

One year of exposure to inhalation of 3 mg of U/m³ as UF₄ dust resulted in definite but mild signs of toxicity in some animals of each of 4 species, the dog, the rabbit, the guinea pig and the rat, but a similar one year of exposure to 0.5 mg of U/m³ as UF₄ resulted in no observable signs of toxicity in dogs and barely detectable signs in only 4 of 105 rats. The toxic effects were related to mild renal changes similar to those found in previous 30-day studies.

No deaths, alterations, in growth rate, hematological counts, blood NPN, urinary protein, or dental fluorosis attributable to exposure to U were observed. There was, however, an elevation of the urinary ratio of amino acid to creatinine of rabbits and there was storage of U in bones, lung, kidney and pulmonary lymph nodes.

M-2015

THE DEPOSITION OF URANIUM IN BONE - II - RADIOAUTOGRAPHS STUDIES

W. F. Neuman and M. W. Neuman (University of Rochester) February 9, 1948 14 pages (Restricted)

Radioautographs of bone containing U²³³ showed this element to be deposited only in the mineral portions and to be particularly concentrated on surfaces adjacent to the circulation and calcification. Once fixed, little redistribution of uranium occurred. As the normal growth and calcification processes continued, new bone accumulated over the lines of deposition and the resorption of bone to some extent was inhibited, probably because of the insolubility of uranium-impregnated bone salt.

M-2016

THE DEPOSITION OF URANIUM IN BONE
III THE EFFECT OF DIET

W. F. Neuman, et al (University of Rochester)
February 9, 1948 14 pages (Restricted)

The effect of several experimental diets on the rate of mobilization of skeletal uranium in rats was tested. Alkaline and acidic diets were without effect: a rachitogenic diet increased the rate of mobilization.

The half-life of skeletal uranium in the rat was found to be of the order of 50 to 60 days.

M-4186

REVIEW OF PERSONNEL MONITORING AT HANFORD ENGINEER WORKS
April 11, 1946 57 pages (Confidential)

An historical summary of the development and operation of the personnel monitoring section of the Health Instrument Department at Hanford. Reproductions of the report forms are included.

INSTRUMENT REPORTS

K-4

THE HF LINE RECORDER

N. H. Pease December 15, 1947 12 pages (Confidential)

The object of this investigation was to adapt the Special C-616 Line Recorder, designed at S.A.M. Laboratories, for operation on plant stream for the detection of HF, to improve its operation, and reduce its operating cost.

The HF Line Recorder is similar to the standard G. E. Line Recorder, but has a source with a heated electron trap, no chemical trap, and no Pirani gage. It is capable of detecting a change of 1/2 to 1% in the HF concentration. It requires frequent calibration and has a large HF background signal.

Operating life was increased from about eighteen days to about forty-eight days, by modifying the heated trap and increasing the sensitivity.

Calibration procedure is outlined and certain specifications are given.

K-125

PRIMARY PRESSURE STANDARD

A. H. Fowler January 21, 1948 7 pages (Restricted)

An engineering development project was undertaken to design and develop a pressure instrument suitable for a primary standard in the range of 0 to 6 Psia with an absolute accuracy of the order of $\pm .001$ Psi.

~~SECRET~~

The first instrument developed employed two modified hook gages connected with a flexible tube and containing acetylene tetrabromide. However, it was too unstable, due to large volumes of dissolved air, fluid volume adjustments, thermal expansion of the liquid, etc.

As a result, a special mercury manometer was developed. This instrument consists of 25 mm glass tubes connected at the bottom to form a U-tube and enclosed, with a laboratory type thermometer, in a cabinet containing plexiglass panels. An adjustable curtain installed behind the manometer, is used to pass a narrow beam of light over the mercury surface. The level of the mercury columns, viewed through a cathetometer telescope, is read on the cathetometer vernier. The difference between readings for each leg being the height of the column, the absolute pressure can be computed. For convenience in producing and holding a constant pressure for testing, and automatic control system was installed.

Results of numerous tests made with this instrument indicate that the height of a mercury column of the order of 10 inches can be measured and converted to Psia with an accuracy of approximately $\pm .0008$ Psi. This accuracy can be maintained provided the instrument is handled as a laboratory instrument and readings are taken under controlled conditions.

It is recommended that this equipment be used as a primary pressure standard for control over secondary standards.

K-144 AN ANNOTATED BIBLIOGRAPHY ON RADIATION DETECTION INSTRUMENT INFORMATION

F. E. Croxton January 15, 1948 (Secret) 105 Pages

This bibliography has been prepared to make available a comprehensive reference to project literature on radiation detection. The references cited represent a search of project literature, classified and unclassified, held by the Technical Information Branch of the Atomic Energy Commission at Oak Ridge, Tennessee as of the date of issuance of this report.

The contents notes shown were taken from the Atomic Energy Commission index cards; where none is shown, no note appeared. The index, which follows the bibliography, has been arranged on a topical basis.

METALLURGY AND CERAMICS REPORTS

ANL-4098 PREFERRED ORIENTATIONS IN BERYLLIUM BOLLED AT DIFFERENT TEMPERATURES

A. Smigelskas and C. S. Barrett January 13, 1948 21 pages (Secret)

It was noted on some work done at M.I.T. on elongation of beryllium at various temperatures from room temperature to 700°C that an increase in elongation occurred in the 300°C to 400°C range. Subsequently, beryllium was rolled at these temperatures in Chicago. The present work is undertaken to determine the mechanisms of deformation.

Because of the importance of preferred orientation in determining the physical and mechanical properties of wrought metals it is well to have a detailed knowledge of these after each of the forming operations that are commonly used. The results reported here are for sheet that has been rolled sufficiently so that the grains should have reached a stable final orientation or "texture".

The preferred orientation developed by rolling beryllium sheet at 200°C, 350°C and 800°C and by recrystallizing sheet after the 350°C rolling gives (001) parallel to the sheet and (100) perpendicular to the rolling direction. Stated another way, the texture is (001) 210; the basal plane lies in the rolling plane with close packed rows of atoms in this plane 30° from the rolling direction.

The scatter is chiefly a tilt around the rolling direction as an axis, the hexagonal axis tilting toward the cross direction roughly 50° each way from the mean orientation; the scatter around the cross direction as an axis is about 20° each way from the mean.

The scatter around R.D. as an axis is estimated to be roughly as follows:

<u>Sample</u>	<u>Range of deviation from mean orientation</u>
R. T. rolling	65°
350°C rolling	50°
800°C rolling	40°
Recrystallized after 350° rolling	40°

It is possible that these ranges merely reflect the greater intensity of the preferred orientation in the sample rolled at lower temperatures, since with less randomly oriented material the traces of material at the extremities of the range of scatter are more readily seen.

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There is no evidence for a sudden change of the stable final texture as temperature is raised, hence, no evidence for an alteration of slip mechanism; however, it cannot be claimed that this entirely eliminates the possibility that such a change exists.

The position of the basal plane in the rolling texture of beryllium is the same, on the average, as its position in rolled metals of similar axial ratio: magnesium, zirconium, and hexagonal cobalt, with $c/a = 1.624$, 1.589 , and 1.624 respectively, and is different from zinc and cadmium with much greater axial ratios.

The orientation of the basal plane implies that twinning is not an important factor in the production of the rolling texture of beryllium for if it were there would be an absence of basal planes parallel to the rolling plane. Likewise the fact that the texture is nearly the same at high rolling temperatures as at low suggests that twinning is not involved, for twinning would be expected to vary in amount with the temperature of rolling. The orientation of the basal plane is consistent with the theory that slip on the basal plane is largely responsible for generating the texture, but it is probable that other slip planes also have been operating.

For the recrystallization texture to be the same as the rolling texture is to be expected since this is true in Mg, Mg-base alloys, Zn, Zn-Cd and Zn-Cu alloys.

HW-8694 DEVELOPMENT OF LEAD DIP CANNING PROCESS
E A. Smith January 29, 1948 17 pages (Secret)

Preliminary experiments were carried out to establish the safety of the process from the standpoint of pyrophoric compounds, and to determine the suitability of the available lead supply.

A development line, consisting of an Al-Si covered lead batch, and an Al-Si dipping bath and an Al-Si canning bath with necessary accessory equipment, and manned cooperatively by Technical and P Department personnel, was established.

Experimental canning procedures were tried and evaluated by all available pertinent testing methods.

Approximately 1500 slugs were prepared for pile testing according to a design recommended by the Statistics Division, to be charged and evaluated under the provisions of P.T. 105-119-P. These slugs included some fabricated by alpha phase rolling and some by gamma phase extrusion, some outgassed and some unoutgassed, some canned on the standard production lines by the triple-dip canning process and some on the Development Line by the lead-dip process according to procedures developed during early stages of the test.

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The lead-dipping process can be made to function as smoothly as the present tripledip process. It offers advantages with respect to simplification of operation, reduced maintenance and upkeep, employment of non-critical materials, increased crucible life, and perhaps most important, permits completion of slug assembly entirely within the temperature range below the alpha-beta transformation of uranium. The outstanding detrimental characteristic is the difficulty with gamma extruded material sticking in the protective sleeves following assembly, which seems to be aggravated by the lower dipping temperature employed. In all quality tests applied, the lead-dipped slugs appeared to be at least the equal of standard triple-dipped ones.

Daily bath analyses indicated that contaminants do not increase linearly with throughput, but rather tend to level off at some maximum value (under 1%) thus suggesting the possibility that the baths may be used indefinitely, with perhaps occasional scavenging and/or readjustment of silicon concentration. Potential savings from such a system are very considerable.

Studies of the safety features of the lead-dip process are favorable. Lead fumes are below dangerous concentration; lower operating temperatures lessen hazards from burns, corrosive HCl fumes are eliminated along with the bronze flux; and no new hazards are introduced.

In general, the adoption of the lead-dip canning process appears entirely feasible.

A number of slugs were decanned by heating in the lead bath and were successfully recanned by a slight modification of the lead-dip canning process. However, it became apparent that evaluation of their quality must await the development of suitable testing equipment. This phase of the work will be covered in the final report on this Production Test.

PHYSICS REPORTS

KAPL-39 FURTHER DEVELOPMENTS OF MULTI-GROUP METHOD FOR INTERMEDIATE PILES
H. Hurwitz, and R. Ehrlich March 1, 1948 28 pages (Secret)

In this report some investigations are described which have been made in the multigroup method for calculating the multiplication constant of intermediate piles (GE-RE-1). The changes in the calculational procedure are of two sorts: first, somewhat altered fundamental group equations have been experimented with and secondly, a numerical integration procedure has been substituted for the analytic method of finding the neutron density in a particular group from the neutron density in the higher energy groups. This latter alteration is advantageous when the number of groups in a problem is large or when more than two media are involved.

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LA-104 I. NEUTRONS PER FISSION FROM 49 COMPARED WITH 25
II SLIGHTLY DELAYED NEUTRONS FROM 49 and 25.
R. R. Wilson July 4, 1944 14 pages (Secret)

The ratio $\lambda_{49}/\lambda_{25}$ has been measured by a coincidence method to be $1.18 \pm .01$. The ratio was found to be the same for a neutron detector with threshold bias at about 20 KeV and for one at about 300 KeV. It was possible to measure the number of neutrons delayed more than 5×10^{-9} sec after fission for 49 as well as for 25. To an accuracy of seven percent, no short time delayed neutrons were found for either 49 or 25.

CRP-356 AN EXPONENTIAL EXPERIMENT ON A LATTICE OF STAINLESS STEEL
JACKETED RODS OF X-METAL IN POLYMER
J. G. Bayly, et al (Chalk River) October 8, 1947 17 pages
(Secret)

An exponential experiment was performed on the following lattice.

X-metal rods: diameter 1.285"
Solid drawn stainless steel jackets, 18/8/1/1.
Inner jacket: 1.298" I.D., wall 0.018" thick
Outer jacket: 1.544" I.D., wall 0.017" thick.
Width of annular gap = 0.105"
The gaps between the jackets were empty.
Mean pitch in hexagonal array = 7.44"
Number of jacketed X-metal rods in tank = 63
Polymer available = 7600 lb., 99.74 atom %.

The tank containing the multiplying medium sat on a graphite column, containing a source of pooneutrons. The neutron density was explored with indium detectors at 10-cm. intervals along five vertical detector tubes and along four radii in three horizontal planes 40 cm. apart.

The effective radius of the tank was found to be 83.11 ± 0.3 cm. from the transverse analysis of the measured densities of neutrons in the three horizontal planes. After a number of small corrections had been applied, the relaxation length was found to be 47.83 ± 0.18 cm. from the vertical analysis of the neutron densities. The final value of the (negative) Laplacian was $(397 \pm 10) 10^{-6}$ cm.⁻² and the critical volume 18.7 ± 0.7 m³ for a bare cylinder of optimum shape.

The cadmium ratio for pile neutrons was 7.90 ± 0.15 .

LAMS-633 FURTHER EVIDENCE FOR A γ -p PROCESS IN Be⁹
R. L. Conklin, and Wm. E. Ogle October 15, 1947 8 pages (Un-
classified)

Alpha-particles from beryllium have been observed after irradiation by 20 Mev x-rays. The decay half-life was within experimental

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error of the 0.88 second half-life of Li^8 . The alphas are explained by the processes $\text{Be}^9 (\gamma - p) \text{Li}^8$, $\text{Li}^8 \rightarrow \text{Be}^8 + \text{beta}$, $\text{Be}^8 \rightarrow 2 \text{He}^4 + Q$, where Q is ~ 3.4 Mev. This substantiates the work covered in LAMS-443, which reported evidence for the $\gamma - p$ process in Be^9 .

LAMS-639 ON THE ACCURACY OF A PROCEDURE OCCURRING IN THE MONTE CARLO METHOD

Arnold Siegert January 7, 1948 16 pages (Secret)

Assuming that after an actual run the numbers of original cards belonging to class k ($k = 0 \dots K$) are observed to be n_k

$$\sum_{k=0}^K n_k = n$$

the classification being made according to the number of descendants of given specifications - we have calculated the joint probability density for the probabilities ϕ_k that an original card will be of class k . From this joint probability density, the distributions of

$$\sum_{k=0}^K \frac{(\phi_k - n_k/n)^2}{n_k/n} \quad \text{and} \quad \sum_{k=0}^K \alpha_k \phi_k$$

(α_k arbitrary) have been computed. The former indicates how well the actual probabilities ϕ_k are approximated by the numbers $\frac{n_k}{n}$; the latter can be used to obtain the probable error in the total number of descendants of given specifications.

PROGRESS REPORTS

KAPL-6 ATOMIC REACTOR FOR NAVAL SHIP PROPULSION-PROGRESS REPORT TO NOVEMBER 1, 1947

D. R. Miller November 17, 1947 11 pages (Secret)

The report presents progress made on studies of atomic reactors for naval ship propulsion subsequent to issuing of Report No. A-4208 (GE-KAK-1) on June 16, 1947, entitled "Survey of Atomic Power Plants for Naval Ship Propulsion". The reactor study program has been confined temporarily to effort only on analyses of factors affecting the composition and size of a reactor suitable for a Destroyer Escort.

BMI-HWR-30 PROGRESS REPORT FOR THE MONTH OF DECEMBER, 1947

H. W. Russell, et al (Battelle Memorial Institute) January 1, 1948 8 pages (Secret)

Experimental studies of beryllia fabrication, concrete shielding, development of unconventional ceramics, aluminum-uranium alloys, uranium-nickel bonding, the uranium-carbon system creep testing of beryllium, porosity in beryllium castings, joining of beryllium, corrosion of beryllium, thorium and its alloys, and jacketing for high-temperature service have been continued.

MIT-1001 TECHNICAL PROGRESS REPORT FOR THE PERIOD OCTOBER, 1947 through
JANUARY 1948

A R. Kaufmann (Massachusetts Institute of Technology)
February 4, 1948 46 pages (Secret)

Zirconium obtained from the Bureau of Mines appears to corrode slowly in water at 600 psi and 250°C, while Foote Mineral Company zirconium is not attacked. The physical metallurgy of various samples of zirconium is being studied.

Attempts to electrolyze oxygen in beryllium by a method which works for zirconium have not led to any successful results. A successful distillation run on beryllium indicates that large purification with regard to boron and iron is possible. Billets of beryllium $8\frac{1}{4}$ " in diameter have been extruded on the large Revere press with 10 times reduction. The deep etch in dilute H_2SO_4 is better than a fracture inspection for revealing defects in beryllium. Machined tensile specimens of beryllium have a thin layer of damaged metal on the surface which greatly reduces the tensile strength and ductility. The low ductility of beryllium in a direction perpendicular to the extrusion direction occurs in both flake and vacuum melted beryllium and is not removed by annealing nor does it disappear when tested at temperatures up to 800°C.

Tests on the rate of collapse of Brookhaven finned aluminum tubes are in progress. The reaction of uranium with aluminum at 350°C is being studied on canned slugs. Apparently beryllium reacts slowly with graphite at 600°C.