the change of recrystallization temperature with impurity, and the inner structure change due to the annealing.

The specimens used in this experiment were prepared by rolling the polycrystal aluminium (99.99%, 99.9% and 99% in purity) in various degrees, which had previously been annealed in vacuum at 400°C for 1 hr., at 450°C for 4 hrs. and at 500°C for 4 hrs. respectively. The X-ray examination was performed by the Laue method, utilizing the heterogeneous X-rays emitted from Cu anticathode.

The results thus obtained will be summarized as follows.

(1) The hardness of specimens increases rapidly from the reduction percentage of 20~30%, whereas it decreases slightly at 50~60% and then increases again up to the reduction percentage of 80%.

(2) Comparing the diffraction patterns actually obtained with the theoretical ones calculated by the aid of Nishikawa's formula, the following results were obtained: the fibrous arrangement of the specimens which were rolled to the reduction percentage of 50~70%, was consisted of micro-crystals with their <112> and <110> axes parallel to the direction of rolling; and that of those specimens at 80~92% wss consisted of the same with <110> and <111> axes; and lastly at the reduction percentage over 99%, <111> was the only common axis.

(3) The hardness of the specimen of the reduction percentage of 80% increases again at the annealing temperature of 150°C~200°C (for 1 hr.).

(4) The higher the purity of aluminium, the lower the recrystallization temperature becomes.

(5) In the specimens of the comparatively higher reduction percentage of 97%, the micro-crystals rearranged by annealing at the temperature of 400°C~450°C (for 1 hr.) are smaller than those at the temperature of 300°C~350°C (for 1 hr.).

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7. On the Inner Structure of Copper Deposited from the Difference of the Electrolytical Solutional Tension

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Although many investigations have hitherto been carried out concerning the X-ray analysis of the crystal configurations in some electrodepasited metal and alloys, only those X-ray analyses on silver and head have been reported that were deposited from the difference of the electrolytical solutional tension.

In the present investigation, the metallic coppers were used as specimens which were deposited by putting a small piece of zinc into a copper sulphate solution of 10~20% strength.

The X-ray analysis of speciments was performed by the Laue method, utilizing the heterogenous X-rays emitted from Cu and Fe anticathodes. The results thus obtained will be summarized as follows.

(1) When the distillated water was employed as solvent, it can be deduced in the Laue photograph that the metallic copper deposited from the 10% solution may be composed of perfectly irregular aggregation of the micro-crystals of the diameter 10^{-3} cm~10^{-4} cm, but when the hard water was used as solvent, the copper from the same concentration as before, may be consisted of an irregular congregation of the micro-crystals of the diameter 10^{-2} cm~10^{-3} cm accompanying with the aforesaid assemblage.

(2) The specimen which was deposited from the 20% solution, when the hard water was used as solvent, is made of two fibrous arrangements of the micro-crystals of appreciable size (10^{-2} cm in diameter), each having the axis of the indices <110> in common. One of these fibrous arrangements has its common axis of the same indices coinciding with the parallel to the direction of growing, and the other has its common axis inclining with 30° to the direction of growing.

(3) Certain reddish-black colour materials which were deposited on the surface of zinc together with metallic copper, were determined as Cu_2S by means of the powder method.

8. Quantitative Determination of Nickel and Cobalt in Sea Water

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Nickel in sea water has been studied by Ernst and Hörman (1936), and determined spectroscopically as 0.1 γ/L. Cobalt has been detected in marine organisms and sea water, but not quantified yet.

The authors has colorimetrically quantified Ni and Co in sea water by the use of oxidized dimenthylglyoximate method and thiocyanate method as follows;

Determination of Ni: 40–60L of sea water was taken and added 200 mg of Fe as $FeCl_3$ solution. Then Fe $(OH)_3$ was precipitated with 60ml of NH_4OH (1 : 10), and allowed to stand for 2–3 days. The precipitate was filtered, and dissolved in 30ml of HCl (1 : 1), then added 10ml of 10% citrate solution and nearly neutrlized, with NH_4OH just to alkaline. Then Ni was extracted 2 times with each 10ml of 1% dimthylglyoxime-$CHCl_3$ solution, and reextracted with 10ml of 5N–HCl from CHCl layer. The HCl solution of Ni was treated with Br_2 water, neutralized with