

THE PRECIPITATION OF NICKEL COMPOUNDS AND PREPARATION OF SPONGY NICKEL.

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TEXTBOOKS on both qualitative and quantitative analysis are somewhat limited in their remarks concerning the behaviour of nickel solutions with ammonia, and there is little in them to suggest that ammonia is a possible reagent for the precipitation of nickel salts. In Roscoe and Schorlemmer's "Chemistry," however, the statement is made that nickel is precipitated as hydroxide by the fixed alkalis, that the precipitate dissolves in ammonia, and separates out as a green crystalline powder on boiling the ammoniacal solution.

This statement was found to be correct. The nickel separates in a form easy to filter and wash, and of course is free from fixed alkali. This would be an ideal method for determining nickel were it not for the fact that the precipitation is not complete, but the filtrate contains enough nickel in solution to be slightly greenish in colour.

Further addition of ammonia and boiling failed to produce more precipitate. With the hope that hydrazine might give better results, the original nickel solution was boiled with an excess of hydrazine hydrate. This produced a precipitate from neutral solutions of varying colour, but with an excess of the reagent the precipitate was a delicate blue-violet. This precipitate was crystalline, could be easily filtered and washed, and, except in colour, appeared physically much the same as the precipitate produced by ammonia. But here again it was found that the filtrate contained nickel, which further addition of the reagent and boiling failed to precipitate.

While neither ammonia or hydrazine hydrate gave filtrates free from nickel, it was found that if the filtrate from the ammonia precipitation was treated with hydrazine hydrate the remaining nickel was completely precipitated, as evidenced by the filtrate being clear and colourless. Operating in the opposite manner, and adding ammonia to a hydrazine hydrate filtrate, no further precipitate was formed. The explanation appeared obvious: Hydrazine will precipitate nickel completely from solutions containing ammonium salts, but ammonia will not cause a complete precipitation in solutions containing hydrazine compounds. This proved to be the case, and, starting with a nickel solution containing ammonium chloride, the hydrazine precipitated the nickel completely.

Either the precipitate produced by ammonia or hydrazine may be easily reduced to spongy nickel by heating in hydrogen. The spongy nickel is free from fixed alkali.

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