

*A New Colorimetric Method for the  
Determination of Beryllium with Neo-thorone*

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In order to determine a few micrograms of beryllium, a new colorimetric method has been developed based upon the stable violet-colored beryllium complex of Neo-thorone<sup>1)</sup> (*o*-arsonophenylazo-chromothropic acid)<sup>2)</sup> in an aqueous solution.

1) S. Shibata and T. Matsumae, *This Bulletin*, **31**, 377 (1958).

2) V. Kuznetsov, *Compt. rend. acad. Sci. U. S. S. R.*, **31**, 898 (1941).

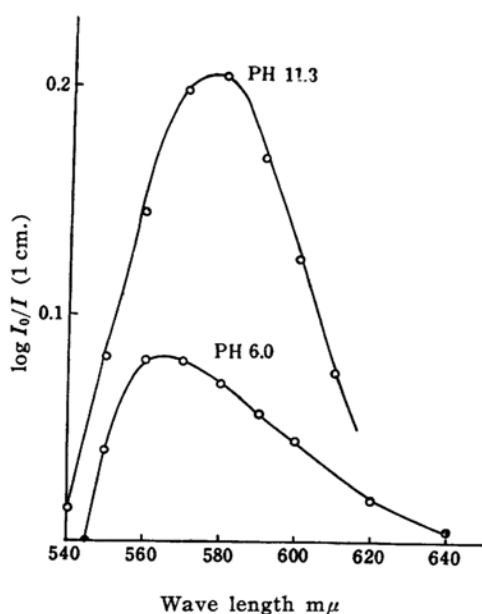


Fig. 1. Absorption spectra of Neo-thorone-beryllium complex at pH 6.0 and 11.3.

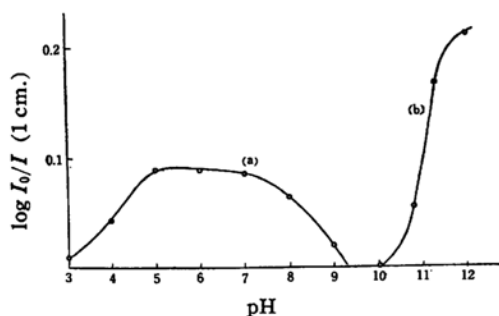


Fig. 2. The effect of pH on the absorbance (a, at 570 mμ; b, at 580 mμ).

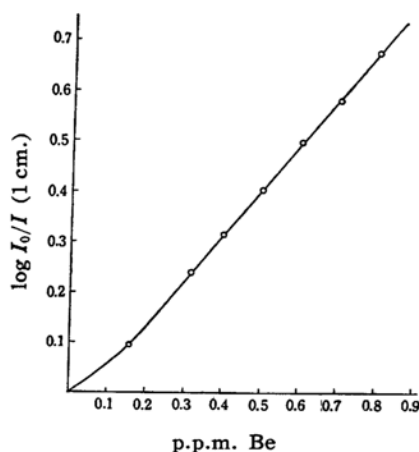


Fig. 3. Absorbance-concentration curve of beryllium (570 mμ, pH 6.0).

Absorption spectra of the complex are presented in Fig. 1. These curves were measured in a buffered solution of pH 6.0 and 11.3 respectively. The violet colored complex of beryllium was formed by adding several micrograms of beryllium and 1.0 ml. of 0.1% reagent solution to a 25 ml. volumetric flask and diluting to the mark with a buffered solution of pH 6.0. Color was developed within five minutes and its stability was found to be quite adequate for the determination of beryllium, the absorbance being proportional to beryllium concentration in the range from 0.15 p.p.m. to at least 1 p.p.m. (Fig. 3). At 570 mμ, the molar extinction coefficient is about 7,160, the sensitivity being 0.03 μg. Be/cm<sup>2</sup> corresponding to  $\log I_0/I=0.001$ .

In a strong alkaline solution (pH 11.0~12.0), the absorbance becomes very high. The relationship between absorbance and pH of solution is shown in Fig. 2. The results given in Fig. 2 indicate the presence of two species of neo-thorone-beryllium complex. At pH 11.3, the absorbance is proportional to beryllium concentration in the range from 0 to 0.15 p.p.m. (Fig. 4). At

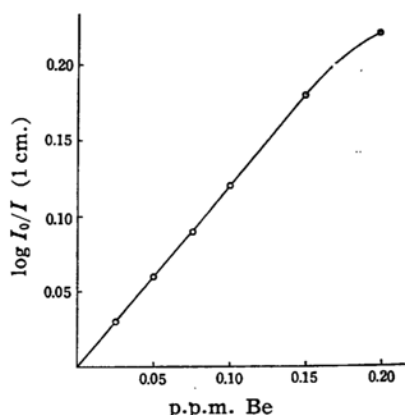


Fig. 4. Absorbance-concentration curve of beryllium (580 mμ, pH 11.3).

580 mμ, the molar extinction coefficient is about 10,000, the sensitivity being 0.002 μg. Be/cm<sup>2</sup> corresponding to  $\log I_0/I=0.001$ .

Thus these two methods appear to offer a good basis for the colorimetric determination of microgram amounts of beryllium. Details of the study will be published later.

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