



## ANNOTATION PAPER

ON THE IDENTIFICATION OF ZINC AS  
ZINC TETRATHIOCYANATOMERCURATE(II)

WOLFGANG WERNER

Institut für Pharmazeutische Chemie der Westf. Wilhelm-Universität, Hittorfstr. 58-62,  
D-48149 Münster, Germany

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**Summary**—The presence of iron(III) at the precipitation of zinc tetrathiocyanatomercurate(II) renders the identification of zinc unambiguous.

The colourless crystals of  $Zn[Hg(SCN)_4]$ , which precipitate slowly in an acid solution within 1–2 min, can serve as a convenient zinc identification reaction. Usually it is recommended to add cobalt ions to obtain blue mixed crystals or copper ions which lead to violet mixed crystals.<sup>1-4</sup>

But the addition of cobalt ions is problematic, as  $Co[Hg(SCN)_4]$  alone is of low solubility and of blue colour too.<sup>1,3,4</sup> It can therefore be confused with zinc. The addition of copper ions do not render this zinc identification more reliable: contrary to the statement of Shvela,<sup>2</sup> “that copper salts alone do not form a precipitate with the ammonium tetrathiocyanatomercurate(II) reagent”,  $Cu[Hg(SCN)_4]$  is yellow-green and of the same low solubility as the zinc salt.<sup>3</sup> The quantity of copper in the presence of zinc yields precipitates of different colours:<sup>1</sup> with more than 10% it is black, with about 10% of copper it is dark violet, with 1% it is blue and with 0.1% it is still rose coloured.

Iron(III) gives no precipitation with ammonium tetrathiocyanatomercurate(II); the solution is of dark red colour, because thiocyanate, from the dissociation of the complex and from the preparation of the reagent, reacts with iron(III).

This colour is sometimes indicated as troubling the zinc reaction.<sup>2,4</sup> However, if  $Zn[Hg(SCN)_4]$  is precipitated from a solution containing about 10% or even more of iron(III) compared to the zinc, the crystals are red to violet brown, with 1% of iron(III) they are still rose coloured.

Precipitations with cadmium instead of zinc gives analogous coloured crystals but the solubilities are 10 times higher.<sup>3</sup> The reagent should not contain too much of free thiocyanate, as the excess of thiocyanate is able to redissolve the precipitates or to prevent them by complexing zinc and cadmium.

## REFERENCES

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