

BORABENZENE METAL COMPLEXES

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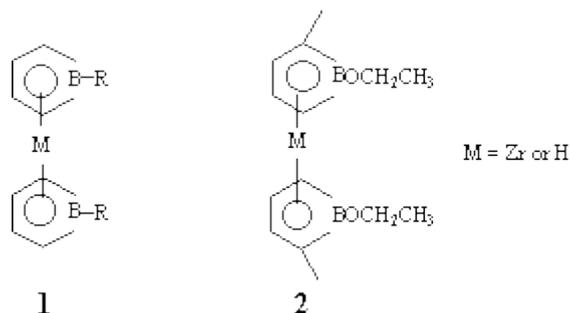
ABSTRACT

Title compounds (**1**) were first synthesized in 1970 by Herberich *et al.*¹. These bisborabenzene transition metal derivatives are similar to metallocenes since the borabenzene moiety behaves as a 6- π -e- ligand². The reaction of alkali metal salts of 1-substituted borabenzene anions with appropriate metal halides give 1-substituted borabenzene metal derivatives³.

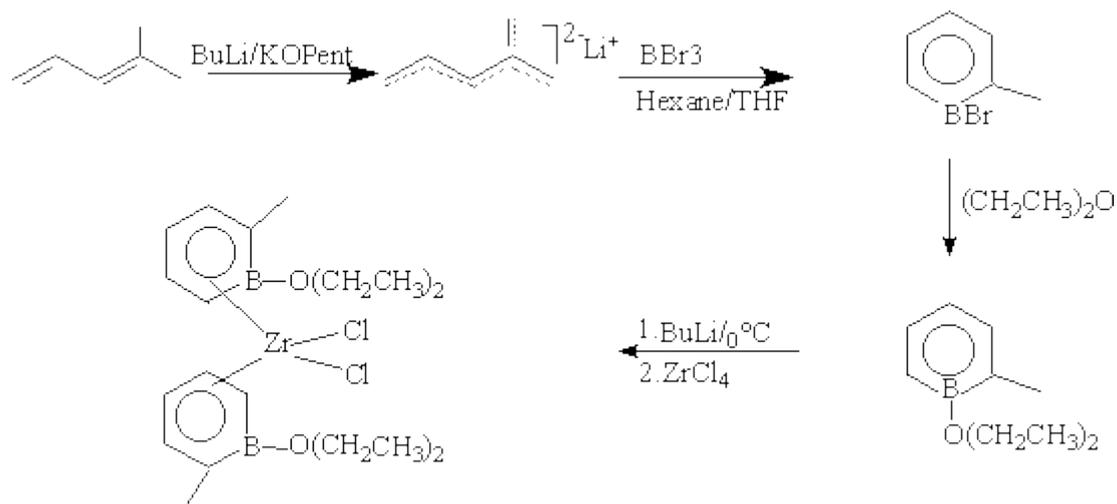
Borabenzene and boratabenzene derivatives⁴ were previously accessible via the cobaltocene¹ and the tin route². Both routes are difficult and laborious and that resulted in limited borabenzene chemistry. In 1993 Herberich *et al.*⁵ reported on a new approach to borabenzene chemistry, through metalation of pentadienes followed by reaction with boron salts. Subsequently further study on synthesis of boratabenzene salts from 2,4 pentadienylboranes were carried out⁶. Later on an improvement to the synthetic approach to the borabenzene was reported by Herberich *et al.*⁷ in 1996 which involved double kaliaation of the pentadienes.

The borabenzene metal complex polymerized ethylene and mixtures of ethylene and 1-octene when treated with excess MAO^{8,9}. The products produced were polyethylenes which had 1% 1-octene. It was reported that some borabenzene metal complex oligomerize ethylene to higher 1-alkenes in the presence of MAO¹⁰.

A study will be made on the synthesis of the borabenzene metal complexes (**2**) by double kaliaation of pentadienes followed by subsequent ring closure with BBr₃. The then synthesized boratabenzene anion will be converted to ethoxy borabenzene. The ethoxy borabenzene will be a precursor to the synthesis of transition metal borabenzene metal complex. The complex will be used to oligomerize ethylene to higher 1-alkenes, as well as to synthesize polymers in combination with other catalysts.



The proposed path for the synthesis is as follows:



References

1. Herberich G. E., Greiss G., Heil H. F.; *Angew. Chem Int. Ed. Engl.* **1970**, 9, 805.
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3. Ashe A. J. III, Meyers E., Shu P., Von Lehman T., Bastide J., *J. Am. Chem. Soc.* **1975**, 97, 6875.
4. Herberich G. E., Ohst H., *Adv. Organomet. Chem.* **1986**, 25, 199.