INTRODUCTION

The olefin metathesis catalyst WCl₆/C₂H₅AlCl₂ is a strong Lewis acid which, consequently, promotes secondary cationic reactions such as prototropic isomerization, alkylation of the aromatic solvent and oligomerization /1–5/. It has been
postulated that alkylation and metathesis are competitive reactions occurring on
the same active site /4/. We wish to report on a catalytic system derived from
pentavalent tungsten, WBr5/C2H5AlCl2. To avoid alkylation of the solvent, we
have used chlorobenzene, thus the only secondary cationic reaction observed was
oligomerization of the olefin. The cis-trans isomerization of the olefins, not tak-
ken into account, is probably due to a metathesis mechanism /5/. WBr5 has been
chosen because W5+ is a likely intermediate in the activation of WCl6 by
C2H5AlCl2 /6/.

EXPERIMENTAL

C2H5AlCl2 was supplied by Ethyl Corporation. It was purified by vacuum
sublimation and dissolved in anhydrous chlorobenzene. WBr5, a Merck product,
was stored and handled under argon. Chlorobenzene was of a commercial R. P.
grade. It was refluxed on P2O5 through a 5A molecular sieve column and stored
under argon. Cis-2-pentene had a purity of 95%. It was distilled from Na and
stored under argon.

The apparatus used for the kinetic experiments included a batch reactor
made of glass. Samples of the liquid phase were withdrawn at suitable time inter-
vals and the catalyst was decomposed with butanol before chromatographic analysis.

Analyses were performed using a 1GC 15 flame ionization chromatograph.

RESULTS

In most of the experiments the olefin concentration was the same as in
Table 1, in each kinetic run we started with a given concentration of WBr5 and
added increasing amounts of C2H5AlCl2. Simultaneously the yields of metathesis