Organoselenium-Catalyzed Asymmetric syn-Diamination of Alkenes

Selected examples:

- **R1 = R2 = Alk, Ar**
  - TsN\(_2\)N\(_2\)Ts
    - 88% yield, er = 95:5
  - TsN\(_2\)N\(_2\)Ph
    - 49% yield, er = 98:2
  - TsN\(_2\)N\(_2\)O
    - 66% yield, er = 87:13

Proposed catalytic cycle:

- The reaction proceeds through the formation of a Se-Se bond in the catalyst. This step is followed by the activation of the alkene with a dialkylating agent.
- Subsequently, the diamination occurs with excellent enantioselectivity.

**Significance:** Denmark and co-workers report an intermolecular enantioselective diamination of alkenes by using a chiral arylselenium reagent as a redox catalyst. A wide variety of trans-1,2-disubstituted imidazolidin-2-ones were obtained in yields of up to 89% and with er values of up to 98:2.

**Comment:** By this method, aryl–alkyl or diaryl olefins were diaminated in good yields and with moderate to high enantioselectivities. However, poor reactivity was observed with dialkyl substrates, which limits the general applicability of this reaction.