Asymmetric Total Synthesis of Illisimonin A
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1) Name of starting material?
*geraniol*

4) Structure of neocuproine?

10) *Hint: 2 rings formed.* Please show mechanism and suggest name.
tandem Nazarov-ene cyclization (see later)
16) DIBAL
17) Ph$_2$SiCl$_2$, DMAP, Et$_3$N
18) 2, 15-crown-5
19) mCPBA, NaHCO$_3$
20) Cp$_2$TiCl$_2$, Zn
21) TBSCI, imidazole
22) mCPBA, NaHCO$_3$

18) Structure of 15-crown-5?

23) Name of the reaction? Please suggest a mechanism.
semipinacol rearrangement (see later)
26) Name of the reaction?
Pinnick oxidation
28) Name of the reaction?
White–Chen oxidation
**Mechanism step 10:**

\[
\text{Mechanism step 10:} \quad \text{B(C}_5\text{F}_5)_3, \text{ toluene, r.t.} \quad \rightarrow \quad [\text{intermediate}] \quad \rightarrow \quad [\text{product}] \quad \text{then TESOTf, 2,6-lutidine, 0 °C to r.t.} \quad \rightarrow
\]

**Mechanism step 23:**

\[
\text{Mechanism step 23:} \quad \text{SnCl}_4, \text{ CH}_2\text{Cl}_2, \quad -78 °C \quad \rightarrow \quad [\text{intermediate}] \quad \rightarrow \quad [\text{product}] \quad \rightarrow
\]