

Due: October 19, 2006

Ford and coworkers have published a manuscript describing reactive intermediates relevant to the carbonylation of  $\text{CH}_3\text{Mn}(\text{CO})_5$ . {S. M. Massick, V. Mertens, J. Marhenke, P. C. Ford, *Inorg. Chem.* **2002**, *41*, 3553-3559}

- Describe in detail their arguments for assigning the proposed intermediate from CO loss in  $\text{CH}_3\text{C}(\text{O})\text{Mn}(\text{CO})_5$  in non-interacting solvents as an  $\eta^2$ -acyl species.
- What explanations are provided for the difference in reactivity of the intermediates afforded in cyclohexene *versus* THF in this process?
- Explain the KIE found in the decarbonylation of  $\text{CH}_3\text{C}(\text{O})\text{Mn}(\text{CO})_5$  and  $\text{CD}_3\text{C}(\text{O})\text{Mn}(\text{CO})_5$ .
- What rationale was provided for the differences observed in activation parameters in cyclohexene *vs* THF for methyl migration in the intermediates resulting from CO loss in  $\text{CH}_3\text{C}(\text{O})\text{Mn}(\text{CO})_5$ ? How different were the  $\Delta G^\ddagger$  values for these processes?