

Supporting Information for the Paper

Three-Steps Metal-Promoted Allene-Based Preparation of Bis(Heterocyclic) Cyclophanes from Carbonyl Compounds

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¹ H NMR and ¹³ C NMR Spectra	S3–S34

(a) Starting ketones **5** were prepared using our methodology: Alcaide, B.; Almendros, P.; Aragoncillo, C.; Rodríguez-Acebes, R. *J. Org. Chem.* **2001**, 66, 5208.

(b) For the synthesis of glucofuranoside **6**, see: Adhikary, N. D.; Chattopadhyay, P. *Eur. J. Org. Chem.* **2011**, 7346.

(c) Starting 4-oxoazetidine-2-carbaldehyde **7** was prepared using our methodology: Alcaide, B.; Almendros, P.; Redondo, M. C.; Ruiz, M. P. *J. Org. Chem.* **2005**, 70, 8890.

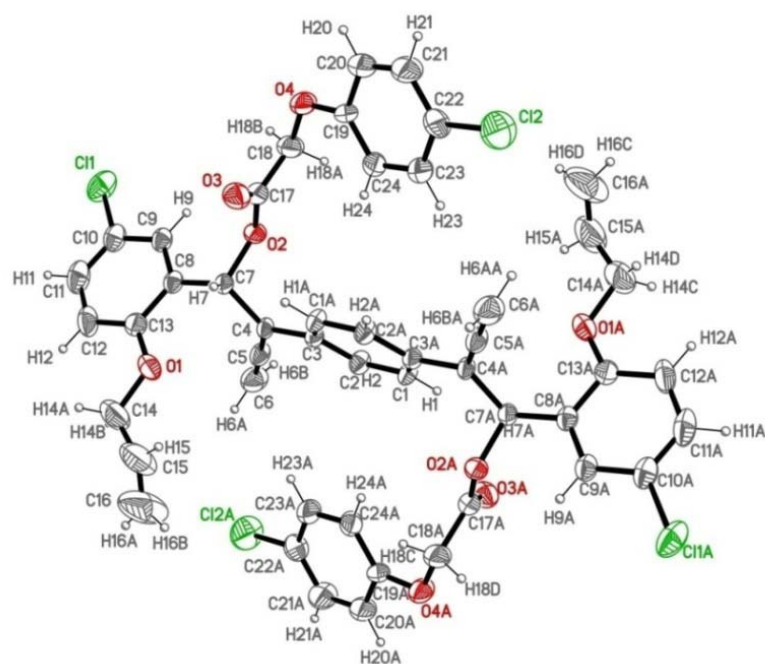


Figure S1. ORTEP drawing of bis-(4-chlorophenoxy)acetate *anti*-4.

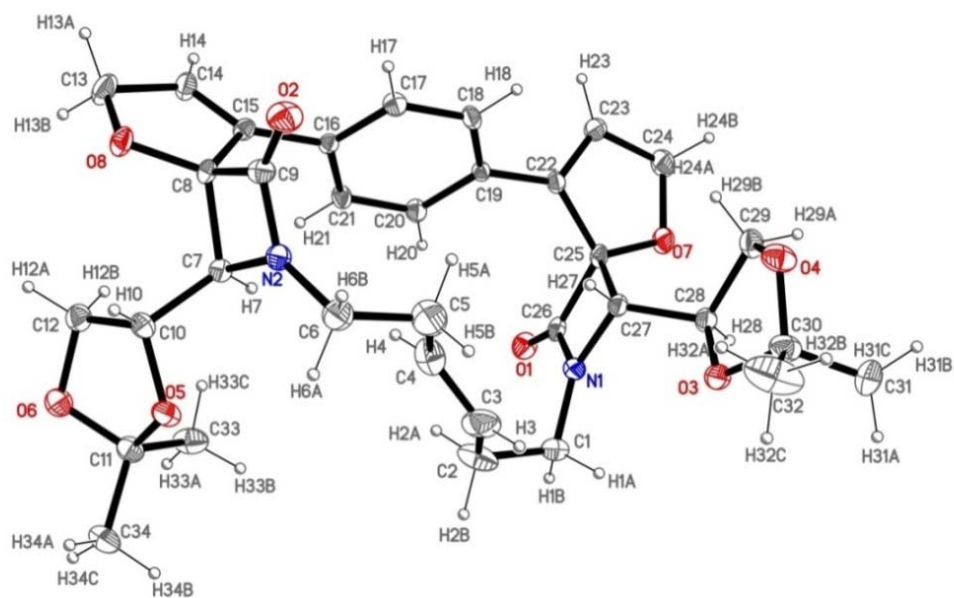


Figure S2. ORTEP drawing of macrocyclic β -lactam *E*-19.

