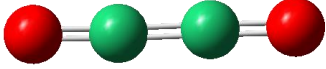
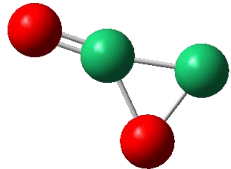
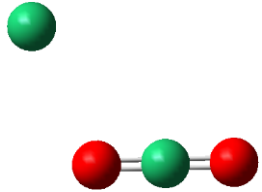
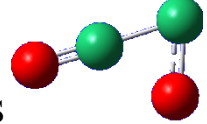


Supplementary information

Table 1. Molecular structures of the possible products formed in the C + C₂O₂ reaction. The transition state for the conversion between linear and cyclic structures is labeled by TS.

	E (Hartree) ccsd(t)/cc-pvQz	ZPE (Hartree) b3lyp/6-311G+(d,p)	Optimized (ccsd(t)/cc-pvQz) molecular geometries
	-226.2839869	0.013683	0 3 C C 1 B1 O 1 B2 2 A1 O 2 B3 1 A2 3 D1 0 B1 1.28630300 B2 1.18677081 B3 1.18695114 A1 179.713802 A2 179.763110 D1 163.1195927
	-226.2376725	0.012735	0 1 C C 1 B1 O 1 B2 2 A1 O 2 B3 1 A2 3 D1 0 B1 1.43418966 B2 1.17691492 B3 1.34931699 A1 168.207507 A2 61.7790892 D1 164.327435
	-226.173412	0.012045	0 3 C O 1 B1 O 1 B2 2 A1 C 3 B3 1 A2 2 D1 0 B1 1.16029800 B2 1.16526686 B3 2.57220476 A1 179.73084427 A2 114.06986082 D1 -176.27164717
 TS	-226.2369514	0.01184647	0 1 C O 1 B1 O 1 B2 2 A1 C 3 B3 1 A2 2 D1 0 B1 1.16211500 B2 1.57288571 B3 1.32715519 A1 129.8803825 A2 60.02247545 D1 -179.9916521