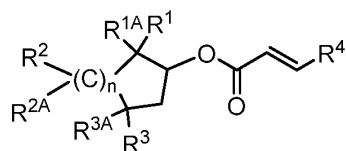


CLAIMS

1. A method of synthesizing a substituted cyclopentenone compound, the method comprising (A) contacting a compound of formula (1) ("compound (1)"):



(1), wherein subscript n is 1, 2, 3, or 4; and each of groups R1, R2, R3, and R4 is independently H or (C₁-C₄)alkyl, or any two adjacent R1 to R3 groups are bonded together to form a (C₁-C₄)alkylene and the remaining group of R1 to R3 is H or (C₁-C₄)alkyl, with an effective amount of a phosphorous pentoxide/methanesulfonic acid reagent (P₂O₅/H₃CSO₃H reagent) and under reaction conditions sufficient to make a compound of formula (2) ("compound (2)"):



(2) ; wherein subscript n and groups R1 to R4 are as defined above; and with the proviso that the contacting step (A) is free of added polyphosphoric acid (PPA).

2. The method of claim 1 wherein the ratio of P₂O₅ to H₃CSO₃H used to make the P₂O₅/H₃CSO₃H reagent is from 0.05/1 to 1/1 (weight/weight).

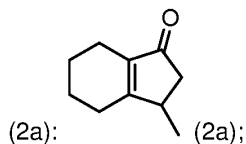
3. The method of claim 1 or 2, wherein the ratio of P₂O₅ to H₃CSO₃H used to make the P₂O₅/H₃CSO₃H reagent is 0.1/1 (weight/weight).

4. The method of any one of claims 1 to 3, characterized by any one of limitations (i) to (xxi): (i) wherein at least one of R1 to R3 is a (C₁-C₄)alkyl or R4 is H; (ii) wherein each of R1 to R4 is H; (iii) wherein each of R1 to R3 is H and R4 is methyl; (iv) wherein each of R1 and R2 is H and each of R3 and R4 is methyl; (v) wherein R1 and/or R2 is methyl and R3 is H; (vi) wherein R1 is methyl, R2 is 1-methylethyl, and R3 is H; (vii) wherein R1 is 1-methylethyl, R2 is methyl, and R3 is H; (viii) wherein R1 and R2 independently are (C₁-C₄)alkyl, R3 is H, and the stereochemistry of the carbon atom bonded to R1 is (R) and the stereochemistry to the carbon atom bonded to R2 is (S); (ix) wherein R1 and R2 independently are (C₁-C₄)alkyl, R3 is H, and the stereochemistry of the carbon atom bonded to R1 is (S) and the stereochemistry to the carbon atom bonded to R2 is (R); (x) both (vi) and (viii); (xi) both (vi) and (ix); (xii) both (vii) and (viii); (xiii) both (vii) and (ix); (xiv) wherein R5 is H; (xv) wherein R5 is methyl; (xvi) both (i) and (xiv) or (xv); (xvii) both (ii) and (xiv) or (xv); (xviii) both (iii) and

(xiv) or (xv); (xix) both (iv) and (xiv) or (xv); (xx) both (v) and (xiv) or (xv); and (xxi) any two adjacent R1 to R3 groups are bonded together to form a (C₁-C₄)alkylene and the remaining group of R1 to R3 is H or (C₁-C₄)alkyl.

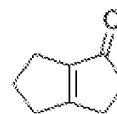
5. The method of any one of claims 1 to 4, wherein the compound (2) is selected from the group consisting of any one of compounds (2a) to (2e):

compound (2a) 2,3,4,5,6,7-hexahydro-3-methyl-1H-inden-1-one, having structure

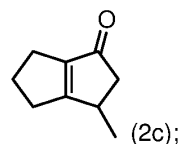


compound (2b) bicyclo[3.3.0]-1(5)-octen-2-one, having structure (2b):

(2b);



compound (2c) 4-methyl-bicyclo[3.3.0]-1(5)-octen-2-one, having structure (2c):



compound (2d) 10-methyl-bicyclo[5.3.0]-1(7)-decen-8-one; and

compound (2e) 2,4,6,11-tetramethyl-bicyclo[6.3.0]-1(8)-undecen-9-one.