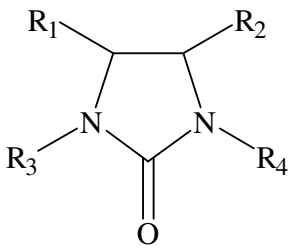
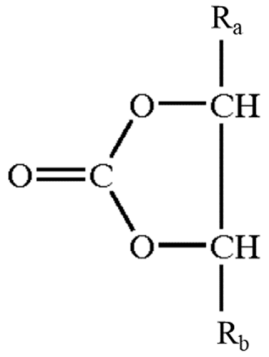
What is claimed is:

1. A process for preparing a cyclic urea derivative having a general formula



where R_1 and R_2 are independently selected from (a) hydrogen, (b) a straight-chain, branched or cyclic alkyl radical having 1 to 12 carbon atoms which can be optionally substituted by C_6-C_{10} aryl, F, Cl or Br, (c) a C_6-C_{10} aryl radical, which can be optionally substituted by C_1-C_{12} alkyl, (d) a heteroalkyl radical in which the alkyl radicals as defined in (b) are interrupted by one or more heteroatoms selected from O, S and N, and (e) a heteroaryl radical with 5 to 10 ring atoms which contain 1 to 3 heteroatoms selected from O, S and N and R_3 and R_4 are independently selected from (a) a straight-chain, branched or cyclic alkyl radical having 1 to 12 carbon atoms which can be optionally substituted by C_6-C_{10} aryl, F, Cl or Br, (b) a C_6-C_{10} aryl radical, which can be optionally substituted by C_1-C_{12} alkyl, (c) a heteroalkyl radical in which the alkyl radicals as defined in (a) are interrupted by one or more heteroatoms selected from O, S and N, and (d) a heteroaryl radical with 5 to 10 ring atoms which contain 1 to 3 heteroatoms selected from O, S and N comprising reacting an alkylene carbonate with a primary amine in the presence of a metal oxide catalyst to form a reaction product comprising the cyclic urea derivative.

2. The process according to claim 1, wherein the alkylene carbonate is a compound having the formula (I):



(I)

wherein R_a and R_b are independently hydrogen, hydroxymethyl, a straight or branched chain C_1-C_{18} alkyl group, an aryl group or an alkylaryl group in which the benzene ring is substituted with a C_1-C_{18} alkyl group**.**

3. The process according to claim 1, wherein the primary amine is a compound having the formula (II):

$$R\text{-}NH_2 \qquad (II)$$

where R is (a) a straight-chain, branched or cyclic alkyl radical having 1 to 12 carbon atoms which can be optionally substituted by C_6-C_{10} aryl, F, Cl, Br; (b) a C_6-C_{10} aryl radical which can be optionally substituted by C_1-C_{12} alkyl; (c) a heteroalkyl radical in which the alkyl radicals as defined in (a) are interrupted by one or more heteroatoms selected from O, S and N; and (d) a heteroaryl radical with 5 to 10 ring atoms which contain 1 to 3 heteroatoms selected from O, S and N.

4. The process according to claim 3, wherein the primary amine is methylamine, ethylamine, propylamine, butylamine, heptylamine, hexylamine, cyclopropylamine, cyclohexylamine, cycloheptylamine, cyclooctylamine aniline, N-methylaniline, N,N-dimethylaniline, m-toluidine, o-chloroaniline, 3,5-dimethylaniline, o-anisidine, 2,5-dichloroaniline, 2,4,6-trichloroaniline, 3,4-dichloroaniline, or benzylamine.

5. The process according to claim 1, wherein the metal oxide catalyst comprises an alkaline oxide or an alkaline earth oxide.

6. The process according to claim 5, wherein the metal oxide catalyst comprises lithium oxide, sodium oxide, potassium oxide, cesium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, rubidium oxide and mixtures thereof.

7. A process for preparing a cyclic urea derivative comprising reacting an alkylene carbonate with a primary amine in the presence of an alkaline metal oxide catalyst and a solvent to form a reaction product comprising the cyclic urea derivative and one or more by-products and optionally subjecting the reaction product to a separation technique to remove at least a portion of the one or more by-products.

8. The process according to claim 7, wherein the alkylene carbonate and the primary amine are present during the reaction at a molar ratio of alkylene carbonate:primary amine of from about 0.5:2.5 to about 1:2.

9. The process according to claim 7, wherein the amount of the alkaline metal oxide catalyst present during the reaction is from about 0.1% by weight to about 5% by weight, based on the total weight of the alkylene carbonate.

10. The process according to claim 7, wherein the solvent comprises water.

11. The process according to claim 10, the water present in an amount of up to about 50% by weight, based on the total weight of the alkylene carbonate.

12. The process according to claim 7, wherein the reaction takes place at a temperature from about 245°C to about 255°C.

13. The process according to claim 7, wherein the separation technique is a concentration, crystallization, recrystallization, distillation, fractional distillation, or chromatography technique.

14. The process according to claim 7, wherein the cyclic urea derivative is 1,3-dimethyl-2-imidazolidinone.

15. The process according to claim 14, wherein the 1,3-dimethyl-2-imidazolidinone is present in the reaction product at a percent yield of at least 80%.