7. The method of claim 1, wherein the fluoride donor comprises ammonium hexafluorosilicate, ammonium bifluoride, ammonium tetrafluoroborate, or any combination thereof; or comprising forming the mixture by impregnating the support material with the fluoride donor by: dissolving the fluoride donor in a solvent; treating the support material with the fluoride donor to form an impregnated support material; and drying the impregnated support material; or

comprising forming the mixture by dry blending the support material with the fluoride donor; or

comprising milling the fluoride donor to form smaller particles; or

comprising: adding a portion of the fluoride donor to the support material; calcining the portion of the fluoride donor to the support material to form a partially fluoride support; and repeating the adding and the calcining.

8. The method of claim 1, wherein the calcining occurs at a temperature of from about 200 °C to about 1000 °C to produce the fluorinated catalyst support.

9. The method of claim 1, comprising:

combining a metallocene catalyst compound and an aluminoxane to produce a first mixture; and

adding the catalyst support to the first mixture and drying to produce a catalyst system; or

forming a catalyst system by combining a metallocene catalyst compound with the fluorinated catalyst support, and an aluminoxane, wherein the aluminoxane is present in an amount of about 10 mmol or less per gram of the fluorinated catalyst support.

10. A catalyst system, comprising:

a metallocene catalyst compound;

a support comprising a fluorinated catalyst support, wherein the fluorinated catalyst support is generated by heating a support material and a fluoride donor compound at a temperature sufficient to decompose the fluoride donor compound in a fluidized bed reactor with a fluidizing gas at a flow rate that forms a fluidized bed with a height to depth ratio of at least about 2.3; and

an aluminoxane, wherein the aluminoxane is present in an amount of about 10 mmol or less per gram of the fluorinated catalyst support.

11. The catalyst system of claim 10, wherein a ratio of a pressure drop across a distributor plate to a pressure drop across the fluidized bed is maintained at greater than about 7 %.

12. The catalyst system of claim 10, wherein a flow rate of the fluidizing gas greater than about 0.35 ft. / sec is maintained at temperatures greater than about 370 °C.

13. The catalyst system of claim 10, wherein a flow rate of the fluidizing gas of about 0.1 ft. / sec is maintained at temperatures less than about 370 °C.

14. The catalyst system of claim 10, wherein a flow rate of the fluidizing gas is increased from about 0.1 ft. / sec. to about 0.4 ft./ sec starting at a temperature of between about 350 °C and about 370 °C.

15. The catalyst system of claim 10, wherein the fluorinated catalyst support has a fluoride concentration ranging from about 1 wt. % to about 10 wt. %, based on a weight of the

fluorinated catalyst support and an aluminum concentration ranging from about 3 wt. % to about 40 wt. % based on the weight of the fluorinated catalyst support; or

wherein the fluorinated catalyst support has a fluoride concentration ranging from about 4 wt. % to about 8 wt. %, based on a weight of the fluorinated catalyst support and an aluminum concentration ranging from about 20 wt. % to about 40 wt. % based on the weight of the fluorinated catalyst support; or

wherein the fluorinated catalyst support has a fluoride concentration ranging from about 2 wt. % to about 4 wt. %, based on a weight of the fluorinated catalyst support and an aluminum concentration ranging from about 3 wt. % to about 10 wt. % based on the weight of the fluorinated catalyst support.

16. The catalyst system according to claim 10, wherein a concentration of metal from the metallocene catalyst compound ranges from about 0.2 wt. % to about 1.3 wt. %, based on a total weight of the catalyst system.

17. The catalyst system according to claim 10, wherein the aluminoxane is present in an amount of about 4 mmol or less per gram of the fluorinated catalyst support; orwherein the aluminoxane is present in an amount of about 2.7 mmol or less per gram of the fluorinated catalyst support.

18. The catalyst system according to claim 10, wherein the aluminoxane comprises methylaluminoxane, modified methylaluminoxane, or a combination thereof.

19. The catalyst system according to claim 10, wherein the support material further comprises silica.

20. The catalyst system of claim 10, wherein the metallocene catalyst has the formula:

$$Cp^ACp^BMX_n \text{ or } Cp^A(A)Cp^BMX_n,$$