polycarbonate. Furthermore, the metal from the catalyst used in the formation of the diaryl carbonate can cause corrosion of the reaction vessel that can result in a further source of metal corrosion, in addition to any degradation of the reaction vessel that can occur independently of the metal catalyst.

[0003] A purified diaryl carbonate reactant is therefore desirable in the production of polycarbonate for use in high transparency applications.

BRIEF SUMMARY

[0004] Disclosed herein are purified diaryl carbonates, methods of making polycarbonate, and the polycarbonate made therefrom.

[0004a] In one aspect, there is provided a method for producing a polycarbonate comprising: reacting a diaryl carbonate with a dihydroxy compound to form a polycarbonate, wherein the polycarbonate comprising a metal contaminant comprises: less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 750 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant.

[004b] In another aspect, there is provided a polycarbonate made by the method disclosed herein.

[0004c] In yet another aspect there is provided a diaryl carbonate comprising a metal contaminant comprising: less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate ad the metal contaminant; less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 10 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant.

[0004d] In another aspect, there is provided a method for producing a polycarbonate comprising: reacting a diaryl carbonate with a dihydroxy compound to form a polycarbonate, wherein the polycarbonate comprises: less than or equal to 1,000 ppb of molybdenum; less than or equal to 33 ppb of vanadium; less than or equal to 33 ppb of chromium; less than or equal to 33 ppb of nickel; and less or equal to 5 ppb iron.

[0004e] In still another aspect, there is provided, a method for producing a polycarbonate comprising: selecting a diaryl carbonate based on a maximum contaminant content and reacting the diaryl carbonate with a dihydroxy compound to form a melt polycarbonate comprising a metal contaminant comprising less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant; less than or equal to 10 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant; wherein the reacting occurs in at least one reactor, and wherein the reactor comprises a reactor contaminant.

CLAIMS

1. A method for producing a polycarbonate comprising:

reacting a diaryl carbonate with a dihydroxy compound to form a polycarbonate,

wherein the polycarbonate comprising a metal contaminant comprises:

less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 750 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and

less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant.

2. The method of claim 1, wherein the polycarbonate comprises less than or equal to 20 ppb vanadium and/or less than or equal to 20 ppb chromium and/or less than or equal to 20 ppb titanium and/or less than or equal to 20 ppb nickel and/or less than or equal to 10 ppb zirconium and/or less than or equal to 20 ppb niobium.

3. The method of claim 1, wherein the diaryl carbonate comprises diphenyl carbonate.

4. The method of claim 1, wherein the dihydroxy compound is of the formula HO—R^1—OH, wherein R^1 is a C_{6-30} aromatic group.

separating the initial crystals from the initial crystal steam;

melting the initial crystals to form an initial molten stream; and

then performing the cooling to form the crystal steam in accordance with claim 14.

17. The method of claim 1, further comprising extruding the polycarbonate, wherein phosphorous acid is added to the extruder.

18. The polycarbonate made by the method of claim 1.

19. A diaryl carbonate comprising a metal contaminant comprising:

less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 10 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and

less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant.

20. The diaryl carbonate of claim 19, wherein the diaryl carbonate comprises less than 20 ppb of vanadium based on the total weight of the diaryl carbonate and any metal contaminant.

21. A method for producing a polycarbonate comprising: reacting a diaryl carbonate with a dihydroxy compound to form a polycarbonate, wherein the polycarbonate comprises: less than or equal to 1,000 ppb of molybdenum; less than or equal to 33 ppb of vanadium; less than or equal to 33 ppb of chromium; less than or equal to 33 ppb of nickel; and less or equal to 5 ppb iron.

22. A method for producing a polycarbonate comprising:

selecting a diaryl carbonate based on a maximum contaminant content and reacting the diaryl carbonate with a dihydroxy compound to form a melt polycarbonate comprising a metal contaminant comprising less than or equal to 500 ppb of molybdenum based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of vanadium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of chromium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 75 ppb of titanium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 375 ppb of niobium based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 33 ppb of nickel based on the total weight of the diaryl carbonate and the metal contaminant;

less than or equal to 10 ppb of zirconium based on the total weight of the diaryl carbonate and the metal contaminant; and

less or equal to 5 ppb iron based on the total weight of the diaryl carbonate and the metal contaminant; wherein the reacting occurs in at least one reactor, and wherein the reactor comprises a reactor contaminant.