Claims:

1. A copolymer of at least one isoolefin monomer and at least one multiolefin and/or β-pinene monomer having a total cyclic oligomer content of less than 3200 ppm and having a ratio of C21/C13 oligomers of less than 1.5.

2. A copolymer produced according to a process comprising: contacting at least one isoolefin monomer with at least one multiolefin and/or β-pinene monomer in the presence of at least one Lewis acid and at least one initiator in a diluent comprising a hydrofluorinated olefin (HFO), the HFO comprising at least three carbon atoms and at least three fluorine atoms; cationically polymerizing the isoolefin monomer with the at least one multiolefin and/or β-pinene monomer to form the copolymer; and, dissolving the copolymer in a solvent suitable for extracting C13 cyclic oligomeric products; and, stripping the solvent and the C13 cyclic oligomeric products from the copolymer.

3. The copolymer according to claim 2, wherein the solvent is non-polar.

4. The copolymer according to claims 2 or 3, wherein the solvent comprises an alkane, preferably hexane.

5. The copolymer according to claim 4, wherein the copolymer has a ratio of C21/C13 oligomers of less than or equal to 1.5 prior to stripping.

6. The copolymer according to any one of claims 2 to 5, wherein the copolymer is produced at a temperature of less than or equal to -75 °C.

7. The copolymer according to any one of claims 2 to 6, wherein the diluent comprises at least three carbon atoms.

8. The copolymer according to any one of claims 2 to 7, wherein the diluent comprises at least four fluorine atoms.

9. The copolymer according to any one of claims 2 to 8, wherein the copolymer has a total cyclic oligomer content of less than or equal to 600 ppm following stripping.

10. The copolymer according to any one of claims 2 to 9, wherein the HFO comprises 1,3,3,3-tetrafluoro-1-propene (HFO-1234ze), 2,3,3,3-tetrafluoro-1-propene (HFO-1234yf), 1,1,3,3-tetrafluoro-1-propene, 1,1,2,3-tetrafluoro-1-propene, 1,2,3,3-tetrafluoro-1-propene or mixtures thereof.

11. The copolymer according to any one of claims 1 to 10, wherein the at least one isoolefin monomer comprises an isoolefin having from 4 to 16 carbon atoms and the at least one multiolefin and/or β-pinene monomer comprises a multiolefin having from 4-14 carbon atoms.

12. The copolymer according to any one of claims 1 to 11, wherein the at least one isoolefin monomer comprises isobutene.

13. The copolymer according to any one of claims 1 to 12, wherein the at least one multiolefin and/or β-pinene monomer comprises a conjugated diene.

14. The copolymer according to any one of claims 1 to 13, wherein the at least one multiolefin and/or β-pinene monomer comprises isoprene, butadiene, 2-methylbutadiene, 2,4-dimethylbutadiene, piperyline, 3-methyl-1,3-pentadiene, 2,4-hexadiene, 2-neopentylbutadiene, 2-methyl-1,5-hexadiene, 2,5-dimethyl-2,4 hexadiene, 2-methyl-1,4-pentadiene, 2-methyl-1,6-heptadiene, cyclopentadiene, methylcyclopentadiene, cyclohexadiene, 1-vinyl-cyclohexadiene or mixtures thereof.

15. The copolymer according to any one of claims 1 to 14 further comprising contacting at least one additional monomer with the at least one isoolefin monomer and at least one multiolefin and/or β-pinene monomer.