What is claimed is:

1. A hydrogenated isotopically enriched boron trifluoride (BF_3) dopant source gas composition, said composition consisting essentially of: (i) boron trifluoride isotopically enriched above natural abundance in boron of atomic mass 11 (^{11}B), and (ii) hydrogen in an amount of from 2 to 6.5 vol.%, based on total volume of boron trifluoride and hydrogen in the composition.

2. The composition of claim 1, wherein the boron trifluoride isotopically enriched above natural abundance in boron of atomic mass 11 (^{11}B) is isotopically enriched above 99%.

3. The composition of claim 1 or claim 2, wherein hydrogen is present in an amount of from 3 to 6.5 vol.%, based on total volume of boron trifluoride and hydrogen in said composition.

4. The composition of claim 1 or claim 2, wherein hydrogen is present in an amount of from 4 to 6 vol.%, based on total volume of boron trifluoride and hydrogen in said composition.

5. The composition of claim 1 or claim 2, wherein hydrogen is present in an amount of 5 vol.%, based on total volume of boron trifluoride and hydrogen in said composition.

6. A boron dopant gas composition supply package, said package comprising a gas storage and dispensing vessel holding a hydrogenated isotopically enriched boron trifluoride (BF_3) dopant source gas composition according to any one of claims 1 to 5.

7. A method comprising introducing a boron dopant source gas composition to an ion source chamber of the boron doping ion implantation system, operating the boron doping ion implantation system to ionize the boron dopant source gas composition in the ion source chamber and generate a beam of boron dopant species that is directed to a substrate in the ion implantation system for boron doping of the substrate therein with the boron dopant species, wherein the dopant source gas composition consists essentially of: (i) boron trifluoride isotopically enriched above natural abundance in boron of atomic mass 11 (^{11}B), and (ii) hydrogen in an amount of from 2 to 6.5 vol.%, based on the total volume of boron trifluoride and hydrogen in the composition, wherein a weight

change of the cathode during said operating, in relation to other hydrogen concentrations is minimized and beam stability and ion source life is enhanced.

8. The method of claim 7, wherein said hydrogen concentration in the dopant source gas composition concurrently minimizes change of bias power and filament current during said operating.

9. The method of claim 7 or claim 8, wherein the boron trifluoride is isotopically enriched above natural abundance in boron of atomic mass 11 (^{11}B) is isotopically enriched above 99%.

10. The method of any one of claims 7 to 9, wherein hydrogen is present in an amount of from 4 to 6 vol. %, based on total volume of boron trifluoride and hydrogen in said composition.

11. The method of any one of claims 7 to 9, wherein hydrogen is present in an amount of 5 vol.%, based on total volume of boron trifluoride and hydrogen in said composition.

12. The method of any one of claims 7 to 11, wherein a beam current of a boron ion implant species is reduced less than 8% when compared to a beam current of the boron ion implant species when no hydrogen is present in the ion source chamber.