WHAT IS CLAIMED IS:

1. A method comprising:

mechanically treating a structurally modified cellulosic or lignocellulosic biomass feedstock that has been structurally modified by exposure to electron beam radiation and further structurally modifying the mechanically treated cellulosic or lignocellulosic biomass feedstock by applying heat.

2. The method of claim 1 wherein mechanically treating comprises a process selected from the group consisting of cutting, milling, grinding, pressing, shearing and chopping.

3. The method of claim 2 wherein mechanically treating comprises grinding.

4. The method of claim 2 wherein mechanically treating comprises milling.

5. The method of claim 4 wherein milling comprises hammer milling.

6. The method of claim 1 wherein the feedstock is subjected to initial mechanical treatment prior to structural modification.

7. The method of claim 6 wherein the initial mechanical treatment comprises size reduction.

8. The method of claim 6 wherein the initial mechanical treatment is performed at ambient temperature.

9. The method of claim 6 wherein the feedstock is cooled prior to, during, or after the initial mechanical treatment.