Claims

1. A soluble stimulus selected from the group consisting of allylamine containing polymers and copolymers and allylamine containing polymers and copolymers modified with a benzyl group, wherein the polymer is capable of binding and precipitating a biomolecule of interest in a sample upon addition of a stimulus.

2. The stimulus responsive polymer of claim 1, wherein the biomolecule of interest is a therapeutic polypeptide.

3. The stimulus responsive polymer of claim 1, wherein the biomolecule of interest is an impurity present in a sample along with a therapeutic polypeptide.

4. The stimulus responsive polymer of claim 3, wherein the impurity is selected from the group consisting of host cell protein, endotoxin, DNA, RNA, viruses, lipids, whole cells and cellular debris.

5. The stimulus responsive polymer of claim 1, wherein the stimulus is a multivalent ion.

6. The stimulus responsive polymer of claim 5, wherein the multivalent ion is phosphate or citrate.

7. The stimulus responsive polymer of claim 3, wherein the therapeutic polypeptide is an antibody.

8. The stimulus responsive polymer of claim 7, wherein the antibody is a monoclonal antibody.

9. A method of separating a target molecule from one or more impurities in a sample, wherein the method comprises the steps of:

(a) providing a sample comprising a target molecule and one or more impurities;

(b) contacting the sample with a soluble stimulus responsive polymer according to claim 1, thereby to form a complex of polymer and the one or more impurities; and

(c) adding a stimulus to the sample, thereby to precipitate the complex out of solution,

thereby to separate the target molecule from one or more impurities.

10. The method of claim 9, wherein the method further comprises one or more filtration steps.

11. The method of claim 9, wherein the method further comprises one or more chromatography step.

12. The method of claim 9, wherein the stimulus is a multivalent ion.