What is claimed is:

1. A method for characterization of a protein in at least one visible or sub-visible particle in a sample, comprising:

~~detecting the at least one visible or sub-visible particle in the sample;~~

isolating and capturing the at least one visible or sub-visible particle;

analyzing the at least one visible or sub-visible particle to identify a presence of a protein using Raman spectroscopy;

subjecting the at least one visible or sub-visible particle to a separation step to produce a separated protein; and

subjecting the separated protein to mass spectrometry analysis~~using a mass spectrometer~~ to characterize the protein.

~~2. The method of claim 1, wherein the at least one visible or sub-visible particle is identified using a Raman spectroscopy.~~

~~3~~2. The method of claim 1, wherein the at least one visible or sub-visible particle has a size of at least about 100 µm.

~~4~~3. The method of claim 1, wherein the at least one visible or sub-visible particle is an inherent impurity.

~~5~~4. The method of claim 1, further comprising capturing the at least one visible or sub-visible particle on a gold-coated polycarbonate membrane.

~~5~~6. The method of claim ~~1~~4, wherein ~~the~~ a pore size of the gold-coated polycarbonate membrane is about 5 µm.

~~7~~6. The method of claim 1, further comprising dissolving the sample in urea after ~~performing Raman spectroscopy analysis~~analyzing the at least one visible or sub-visible particle.

~~8~~7. The method of claim 6, wherein the concentration of urea is about 8 M.

8~~9~~. The method of claim 1, further comprising digesting the sample under denaturing conditions after ~~performing Raman spectroscopy analysis~~analyzing the at least one visible or sub-visible particle.

~~10~~9. The method of claim 1, wherein the sample further comprises a protein of interest.

10~~1~~. The method of claim 9, wherein the protein of interest is an antibody.

11~~2~~. The method of claim 9, wherein the protein of interest is a therapeutic antibody.

12~~3~~. The method of claim 1, wherein said separation step comprises subjecting the at least one visible or sub-visible particle to liquid chromatography separation, wherein the mass spectrometer is coupled to ~~a~~ the liquid chromatography system.

13~~4~~. The method of claim 12, wherein the liquid chromatography system is a nano liquid chromatography system.

14~~5~~. The method of claim 1, wherein the mass spectrometer is a tandem mass spectrometer.

16~~5~~. The method of claim 1, wherein the protein is a host-cell protein.

16~~7~~. A method for quantification of at least one protein in at least one visible or sub-visible particle in a sample, comprising:

~~detecting the at least one visible or sub-visible particle in the sample;~~

isolating and capturing the at least one visible or sub-visible particle;

analyzing the at least one visible or sub-visible particle to identify a presence of the at least one protein using Raman spectroscopy;

subjecting the at least one visible or sub-visible particle to a separation step to produce at least one separated protein; and

subjecting the at least one separated protein to mass spectrometry analysis to quantify~~identifying~~ the at least one protein ~~using a mass spectrometer~~.

1~~8~~7. The method of claim 1~~6~~7, wherein the at least one protein is a host-cell protein.

~~19~~18. The method of claim 1~~6~~7, wherein the at least one visible or sub-visible particle is an aggregate of a protein.

~~20~~19. A method for characterization of a host cell-protein in at least one visible or sub-visible particle in a sample, comprising:

~~detecting at least one visible or sub-visible particle in the sample;~~

isolating and capturing the at least one visible or sub-visible particle;

analyzing the at least one visible or sub-visible particle to identify a presence of a protein using Raman spectroscopy;

subjecting the at least one visible or sub-visible particle to a separation step to produce a separated protein; and

subjecting the separated protein to mass spectrometry analysis ~~using a mass spectrometer~~ to characterize the protein to determine if the protein is the host cell-protein.