Claims:

1. A citrate synthase protein, or functional fragment thereof, encoded by a nucleic acid sequence wherein the nucleic acid is an ancestral gene and wherein the citrate synthase protein, or functional fragment thereof, is capable of forming at least 3 complexation states simultaneously.

2. A citrate synthase protein, or functional fragment thereof, which is capable of forming at least 3 complexation states simultaneously, and has an amino acid sequence selected from:

i) an amino acid sequence at least 80%, 85%, 90% or 95% identical to a sequence selected from SEQ ID NOs: 1-7;

ii) an amino acid sequence with at least 90% or 95% sequence similarity to a sequence selected from SEQ ID NOs: 1-7;

iii) an amino acid sequence selected from any of SEQ ID NOs: 1-7; and/or

iv) an amino acid sequence comprising at least 1 ancestral mutation.

3. A citrate synthase protein, or functional fragment thereof, as claimed in claim 1 or claim 2, wherein said citrate synthase protein, or functional fragment thereof is capable of forming at least 4 complexation states simultaneously.

4. A citrate synthase protein, or functional fragment thereof, as claimed in any one of claims 1 to 3, wherein each of the three most abundant complexation states comprise at least 15% of the total number of citrate synthase protein complexes present.

5. A citrate synthase protein, or functional fragment thereof, according to any one of claims 1-4 wherein the citrate synthase protein, or functional fragment thereof, further comprises a tag to facilitate purification, preferably a His-Tag

6. A citrate synthase protein, or functional fragment thereof, according to any one of claims 1-5 wherein the citrate synthase protein, or functional fragment thereof, is not expressed by an extant organism.

7. A composition comprising a citrate synthase protein, or functional fragment thereof, according to any one of claims 1-6 wherein the concentration of the citrate synthase protein, or functional fragment thereof, is at least 5 nM, optionally the concentration is between 5 nM and 100 μM.

8. Use of a citrate synthase protein, or functional fragment thereof, according to any one of claims 1-6, or a composition according to claim 7 as a molecular weight standard.

9. The use of a citrate synthase protein, function fragment thereof, or a composition as a molecular weight standard according to claim 8 wherein the use is as a calibrant for mass photometry.

10. A method of calibrating a mass photometry device comprising detecting the mass of particles in the composition of claim 7 on a mass photometry device.

11. A nucleic acid sequence encoding a citrate synthase protein, or functional fragment thereof, according to any one of claims 1-6.

12. The nucleic acid sequence according to claim 11 wherein the sequence has been codon optimised for expression in an organism, preferably the sequence has been codon optimised for expression in *E.coli*.

13. A vector comprising the nucleic acid sequence of claim 11 or claim 12, preferably a pET plasmid

14. A cell comprising the nucleic acid sequence of claim 11 or claim 12 or the vector according to claim 13, preferably an *E. coli* cell.

15. The cell according to claim 14, wherein the cell expresses a citrate synthase protein, or functional fragment thereof, according to any one of claims 1-6.

16. A method of producing a citrate synthase protein, or functional fragment thereof, according to any one of claims 1-6 comprising culturing a cell according to claim 14 or 15 and carrying out at least one purification step.