What is claimed is:

1. A sensing system, comprising:

a charge sensor including:

two electrodes; and

an electrically conductive channel connecting the two electrodes;

a polymerase attached to the electrically conductive channel through a first tether, the polymerase to hold a template polynucleotide chain that is to be sequenced; and

a charged molecule that is separate and distinct from the polymerase, the charged molecule being attached i) directly to the electrically conductive channel or indirectly to the electrically conductive channel through a second tether and ii) within a distance of about 5 nm to about 50 nm of the polymerase, wherein the charged molecule:

includes a recognition site to reversibly bind a label of a labeled nucleotide that is being incorporated into the template polynucleotide chain, wherein the label is selected from the group consisting of an antibiotic, an amino acid, and a small molecule selected from the group consisting of theophylline, dopamine, sulforhodamine, and cellobiose;

has an unbound favored conformation associated with an unbound charge configuration; ~~and~~

has a favored conformation associated with a charge configuration when the recognition site is bound to the label, wherein the charge configuration is different from the unbound charge configuration; and

~~a polymerase attached to the electrically conductive channel or to the charged molecule.~~

~~2. The sensing system as defined in claim 1, wherein the charged molecule~~ is a charged aptamer~~.~~

~~3. The sensing system as defined in claim 2, wherein the charged aptamer is~~ selected from the group consisting of a DNA aptamer, an RNA aptamer, and an analog thereof.

~~4. The sensing system as defined in claim 1, wherein the charged molecule is selected from the group consisting of a charged protein and a charged peptide.~~

~~5~~2. The sensing system as defined in claim 1, wherein:

the charged molecule:

further includes a second recognition site to reversibly bind a second label of a second labeled nucleotide and has a second favored conformation associated with a second charge configuration when the second recognition site is bound to the second label;

further includes a third recognition site to reversibly bind a third label of a third labeled nucleotide and has a third favored conformation associated with a third charge configuration when the third recognition site is bound to the third label; and

further includes a fourth recognition site to reversibly bind a fourth label of a fourth labeled nucleotide and has a fourth favored conformation associated with a fourth charge configuration when the fourth recognition site is bound to the fourth label; and

the unbound favored conformation associated with the unbound charge configuration occurs when each of the recognition site, the second recognition site, the third recognition site, and the fourth recognition site is unbound.

~~6~~3. The sensing system as defined in claim 1, further comprising:

a second charged molecule attached to the electrically conductive channel, wherein the second charged molecule:

includes a second recognition site to reversibly bind a second label of a second labeled nucleotide;

has a second charged molecule unbound favored conformation associated with a second charged molecule unbound charge configuration; and

has a second charged molecule favored conformation associated with a second charged molecule charge configuration when the second recognition site is bound to the second label.

~~7~~4. The sensing system as defined in claim ~~6~~3, further comprising:

a third charged molecule attached to the electrically conductive channel, wherein the third charged molecule:

includes a third recognition site to reversibly bind a third label of a third labeled nucleotide;

has a third charged molecule unbound favored conformation associated with a third charged molecule unbound charge configuration; and

has a third charged molecule favored conformation associated with a third charged molecule charge configuration when the third recognition site is bound to the third label; and

a fourth charged molecule attached to the electrically conductive channel, wherein the fourth charged molecule:

includes a fourth recognition site to reversibly bind a fourth label of a fourth labeled nucleotide;

has a fourth charged molecule unbound favored conformation associated with a fourth charged molecule unbound charge configuration; and

has a fourth charged molecule favored conformation associated with a fourth charged molecule charge configuration when the fourth recognition site is bound to the fourth label.

~~8~~5. The sensing system as defined in claim 1, wherein:

the charged molecule further includes a second recognition site to reversibly bind a second label of a second labeled nucleotide and has a second favored conformation associated with a second charge configuration when the second recognition site is bound to the second label; and

the sensing system further comprises a second charged molecule attached to the electrically conductive channel, wherein the second charged molecule:

includes:

a third recognition site to reversibly bind a third label of a third labeled nucleotide; and

a fourth recognition site to reversibly bind a fourth label of a fourth labeled nucleotide;

has a second charged molecule unbound favored conformation associated with a second charged molecule unbound charge configuration;

has a third favored conformation associated with a third charge configuration when the third recognition site is bound to the third label; and

has a fourth favored conformation associated with a fourth charge configuration when the fourth recognition site is bound to the fourth label.

~~9~~6. The sensing system as defined in claim 1, wherein the charged molecule further includes a second recognition site to reversibly bind a second label of the labeled nucleotide.

7. The sensing system as defined in claim 1, wherein:

the charged molecule is the DNA aptamer or the RNA aptamer;

the DNA aptamer or the RNA aptamer is a thiolated aptamer; and

the electrically conducting channel includes an amine terminated silane that is bound to the thiolated aptamer.

8. The sensing system as defined in claim 1, wherein the first and second tethers are separate poly(ethylene glycol) chains.

~~10. A sensing system, comprising:~~

~~a charge sensor including:~~

~~two electrodes; and~~

~~an electrically conductive channel connecting the two electrodes;~~

~~a charged molecule attached to the electrically conductive channel, wherein the charged molecule:~~

~~includes a recognition site to reversibly bind a label of a labeled nucleotide;~~

~~has an unbound favored conformation associated with an unbound charge configuration; and~~

~~has a favored conformation associated with a charge configuration when the recognition site is bound to the label, wherein the charge configuration is different from the unbound charge configuration; and~~

~~a polymerase attached to at least one of the two electrodes or to a substrate on which the charge sensor is positioned.~~

~~11. The sensing system as defined in claim 10 wherein the substrate is a patterned substrate, wherein the charge sensor is positioned in a depression of the patterned substrate, and wherein the polymerase is attached to a surface of the depression.~~

~~12~~9. A sensing apparatus, comprising:

a flow cell; and

a sensing system integrated into the flow cell, the sensing system including:

a charge sensor including an electrically conductive channel;

a polymerase attached to the electrically conductive channel through a first tether, the polymerase to hold a template polynucleotide chain that is to be sequenced; and

a charged molecule that is separate and distinct from the polymerase, the charged molecule being i) directly attached to the electrically conductive channel or indirectly attached to the electrically conductive channel through a second tether and ii) within a distance of about 5 nm to about 50 nm of the polymerase, wherein the charged molecule:

has an unbound favored conformation associated with an unbound charge configuration; ~~and~~

has a favored conformation associated with a charge configuration when a recognition site of the charged molecule is bound to a label of a labeled nucleotide that is being incorporated into the template polynucleotide chain, wherein the charge configuration is different from the unbound charge configuration, and wherein the label is selected from the group consisting of an antibiotic, an amino acid, and a small molecule selected from the group consisting of theophylline, dopamine, sulforhodamine, and cellobiose; and

is a charged aptamer selected from the group consisting of a DNA aptamer, an RNA aptamer, and an analog thereof~~a polymerase attached to the electrically conductive channel or to the charged molecule~~.

~~13~~10. The sensing apparatus as defined in claim ~~12~~9, further comprising a reagent delivery system to ~~selectively~~ introduce a reagent to an input of the flow cell.

~~14~~11. The sensing apparatus as defined in claim ~~12~~10, wherein the reagent is in a sample container, the reagent including the labeled nucleotide, which includes:

a nucleotide;

a linking molecule attached to a phosphate group of the nucleotide; and

~~a recognition site specific~~ the label attached to the linking molecule.

~~15~~12. The sensing apparatus as defined in claim ~~12~~9, further comprising a detector to detect a response from the charge sensor.

~~16. A sensing apparatus, comprising:~~

~~a flow cell; and~~

~~a sensing system integrated into the flow cell, the sensing system including:~~

~~a charge sensor including an electrically conductive channel;~~

~~a charged molecule attached to the electrically conductive channel, wherein the charged molecule:~~

has an unbound favored conformation associated with an unbound charge configuration; and

has a favored conformation associated with a charge configuration when a recognition site of the charged molecule is bound to a label of a labeled nucleotide, wherein the charge configuration is different from the unbound charge configuration; and

a polymerase attached to at least one of the two electrodes or a substrate of the flow cell.

17. The sensing apparatus as defined in claim 16 wherein the substrate is a patterned substrate, wherein the charge sensor is positioned in a depression of the patterned substrate, and wherein the polymerase is attached to a surface of the depression.

1813. A method, comprising:

introducing a the template polynucleotide chain that is to a be sequenced to the sensing system including:of claim 1,

whereby the polymerase holds the template polynucleotide chain;

a charge sensor including:

two electrodes; and

an electrically conductive channel connecting the two electrodes;

a charged molecule attached to the electrically conductive channel, wherein the charged molecule includes a recognition site; and

a polymerase attached to the electrically conductive channel or to the charged molecule;

introducing reagents including labeled nucleotides to the sensing system, whereby the polymerase incorporates a nucleotide of one of the labeled nucleotides associates with into the polymerase template polynucleotide chain, and a recognition site specific the label of the one of the labeled nucleotides associates reversibly binds with the recognition site while the nucleotide is incorporated, which to induces a conformational change of the charged molecule; and

in response to the conformational change of the charged molecule, detecting a response of the charge sensor.

~~19~~14. The method as defined in claim ~~18~~13, further comprising:

associating the response of the charge sensor with the ~~associated recognition site specific~~ label; and

based on the ~~associated recognition site specific~~ label, identifying the nucleotide of the one of the labeled nucleotides.

~~20~~15. The method as defined in claim ~~18~~13, wherein the charged molecule includes a plurality of different recognition sites, each of which is to reversibly bind a different label of a different labeled nucleotide at a distinct rate.

~~21~~16. The method as defined in claim ~~20~~15, further comprising:

detecting a plurality of responses of the charge sensor in response to different conformational changes of the charged molecule when different labeled nucleotides respectively associate with the polymerase and different ~~recognition site specific~~ labels of the different labeled nucleotides respectively bind to ~~one of~~ the plurality of different recognition sites; and

identifying ~~the~~ each respectively associated different labeled nucleotide~~s~~ by the distinct rate~~s~~.

~~22~~17. The method as defined in claim ~~18~~13, wherein the recognition site is to reversibly bind a plurality of different labels of a plurality of different labeled nucleotides at a plurality of distinct rates, and wherein the method further comprises:

detecting a plurality of responses of the charge sensor in response to different conformational changes of the charged molecule when at least some of the different labeled nucleotides respectively associate with the polymerase and at least some of the different labels respectively bind to the recognition site; and

identifying the at least some of the respectively associated different labeled nucleotides by the plurality of distinct rates.

~~23~~18. The method as defined in claim ~~18~~13, wherein the recognition site is to reversibly bind up to four different labeled nucleotides, and wherein the method further comprises:

detecting up to four different responses of the charge sensor in response to different conformational changes of the charged molecule when the up to four different labeled nucleotides respectively associate with the polymerase and the recognition site, wherein each of the up to four different responses has a distinct magnitude; and

identifying each of the up to four respectively associated different labeled nucleotide~~s~~ by the distinct magnitude~~s~~.