CLAIMS

[Claim 1]

An apparatus for adaptively analyzing one or more physicochemical properties, the apparatus comprises:

a sampling chamber configured to receive a liquid sample and to allow the liquid sample to be separated to obtain a supernatant of the liquid sample;

a measuring chamber in fluid communication with the sampling chamber;

a dosing pump arranged between the sampling chamber and the measuring chamber, wherein the dosing pump is configured to draw at least portion of the supernatant from the sampling chamber into the measuring chamber;

one or more sensors configured to measure one or more parameters of the at least portion of the supernatant in the measuring chamber, the one or more parameters representative of the one or more physicochemical properties, wherein the one or more sensors comprise a conductivity sensor configured to measure conductivity; and

a processing unit configured to control receipt of the liquid sample in the sampling chamber, and activation and deactivation of the dosing pump; to receive data for processing, wherein the data includes the one or more parameters of the at least portion of the supernatant measured by the one or more sensors; and to analyze the received data with respect to previous data, wherein the previous data includes one or more parameters of at least portion of a supernatant obtained from a source at an earlier point in time, wherein the processing unit is configured to process the received data using a neural network algorithm for optimizing analysis time of the liquid sample and determining contents of measurement environments to which the liquid sample is exposed.

[Claim 2]

The apparatus as claimed in claim 1, wherein the one or more sensors further comprise a potentiometric sensor configured to measure an electrode potential in the at least portion of the supernatant in the measuring chamber.

[Claim 3]

The apparatus as claimed in claim 1 or 2, wherein the sampling chamber comprises:

a first receptacle configured to receive the liquid sample from the source and to allow the liquid sample to settle and obtain an initial supernatant of the liquid sample;

a second receptacle in fluid communication with the first receptacle; and

a valve arranged between the first receptacle and the second receptacle, wherein the valve is operable by the processing unit to allow at least portion of the initial supernatant to be directed from the first receptacle to the second receptacle, forming the supernatant of the liquid sample in the second receptacle.

[Claim 4]

The apparatus as claimed in claim 3, further comprising a vacuum station configured to create a vacuum in the first receptacle to enable the liquid sample to be transferred from the source.

[Claim 5]

The apparatus as claimed in claim 3 or 4, further comprising a process water inlet for each of the first receptacle and the second receptacle, wherein the process water inlet is configured to supply process water into the respective first and second receptacles and clean away residues therein.

[Claim 6]

The apparatus as claimed in any one of claims 1 to 5, the one or more sensors further comprise an optical sensor configured to measure an optical signal representative of a physicochemical property of the one or more physicochemical properties of the at least portion of the supernatant in the measuring chamber, wherein the processing unit is configured to receive the data further including the optical signal.

[Claim 7]

The apparatus as claimed in any one of claims 1 to 6, wherein the measuring chamber is made of a non-transparent material.

[Claim 8]

The apparatus as claimed in any one of claims 1 to 7, wherein the measuring chamber is made of an anti-abrasive material.

[Claim 9]

The apparatus as claimed in any one of claims 1 to 8, further comprising a drainage outlet for each of the sampling chamber and the measuring chamber, wherein the drainage outlet is configured to drain out unwanted contents in the sampling chamber and the measuring chamber.

[Claim 10]

The apparatus as claimed in claim 9, further comprising a plurality of further valves, each further valve of the plurality of further valves coupled to each of the dosing pump, the process water inlet, and the drainage outlet, wherein the plurality of further valves is operable by the processing unit to control flow through each of the dosing pump, the process water inlet, and the drainage outlet.

[Claim 11]

The apparatus as claimed in any one of claims 1 to 10, further comprising one or more reagent dosing units configured to supply one or more reagents to the measuring chamber.

[Claim 12]

A method for adaptively analyzing one or more physicochemical properties, the method comprises:

receiving a liquid sample;

allowing the liquid sample to be separated to obtain a supernatant of the liquid sample;

drawing at least portion of the supernatant;

measuring one or more parameters of the at least portion of the supernatant, wherein the one or more parameters comprise conductivity;

receiving data for processing by a processing unit, wherein the data includes the measured one or more parameters of the at least portion of the supernatant, the one or more parameters being representative of the one or more physicochemical properties; and

processing, by the processing unit, the received data using a neural network algorithm to analyze the received data with respect to previous data that includes measured one or more parameters of at least portion of a supernatant obtained from a source at an earlier point in time, thereby optimizing analysis time of the liquid sample and determining contents of measurement environments to which the liquid sample is exposed.

[Claim 13]

The method as claimed in claim 12, wherein the one or more parameters further comprises an electrode potential in the at least portion of the supernatant.

[Claim 14]

The method as claimed in claim 12 or 13, wherein the step of receiving the liquid sample comprises receiving the liquid sample from the source and allowing the liquid sample to settle and obtain an initial supernatant of the liquid sample; and sampling at least portion of the initial supernatant to form the supernatant of the liquid sample.

[Claim 15]

The method as claimed in claim 14, further comprising creating a vacuum to enable the liquid sample to be transferred from the source.

[Claim 16]

The method as claimed in claim 14 or 15, further comprising after measuring the one or more parameters of the at least portion of the supernatant, draining out at least one of the initial supernatant, the supernatant, or the at least portion of the supernatant.

[Claim 17]

The method as claimed in claim 16, further comprising after draining out at least one of the initial supernatant, the supernatant, or the at least portion of the supernatant, supplying process water to clean away residues of at least one of the initial supernatant, the supernatant, or the at least portion of the supernatant.

[Claim 18]

The method as claimed in any one of claims 12 to 1817 further comprising measuring one or more optical signals representative of the one or more physicochemical properties of the at least portion of the supernatant, wherein the data for processing by the processing unit further includes the one or more optical signals.

[Claim 19]

The method as claimed in any one of claims 12 to 18, further comprising supplying one or more reagents to the at least portion of the supernatant.