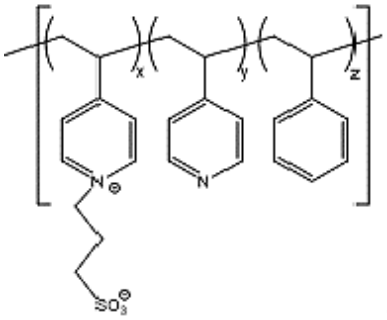
It is therefore desirable to provide a sensor, which addresses the above-mentioned technical challenges.

Summary

The above problem is addressed by an analyte sensor comprising a working electrode and a flux-limiting polymer membrane disposed over the working electrode, with the features of the independent claims. Advantageous examples, which might be realized in an isolated fashion or in any arbitrary combination, are listed in the dependent claims and throughout the specification.

The analyte sensor according to the disclosure is advantageous as it has an improved stability over its lifetime and/or a short run-in time while maintaining sufficient sensitivity.

According to the disclosure, an analyte sensor comprising at least one working electrode and a flux-limiting polymer membrane disposed over the at least one working electrode is provided, wherein the flux-limiting polymer membrane comprises a poly(vinylpyridine)-based polymer, which has the following formula (I):



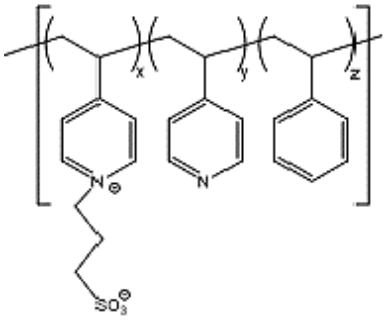
(I)

wherein x is about 2 to about 8 mol-%;

y is about 72 to about 98 mol-% and

z is 0 to about 20 mol-%.

One aspect of the present disclosure relates to an analyte sensor comprising at least one working electrode and a flux-limiting polymer membrane disposed over the at least one working electrode, wherein the flux-limiting polymer membrane comprises a polymer, which has the following formula (I):



(I)

wherein x is about 2 to about 8 mol-%;

y is about 72 to about 98 mol-% and

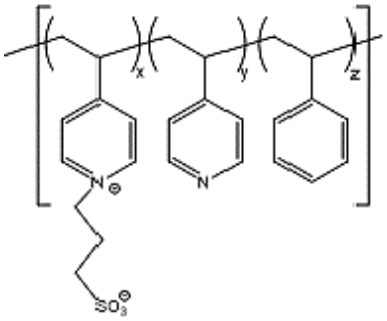
z is 0 to about 20 mol-%.

A further aspect of the present disclosure relates to use of an analyte sensor as described herein for detecting at least one analyte in a sample.

A further aspect of the present disclosure relates to a method for determining an analyte in a sample comprising using the analyte sensor as described herein.

The disclosure further relates to a polymer membrane for use in an analyte sensor, particularly for use as a flux-limiting polymer membrane in an analyte sensor, wherein the polymer membrane comprises a polymer having the formula (I) as indicated above.

A further aspect of the present disclosure relates to a polymer membrane for use in an analyte sensor, wherein the polymer membrane comprises a polymer, which has the following formula (I):



(I)

wherein x is about 2 to about 8 mol-%;

y is about 72 to about 98 mol-% and

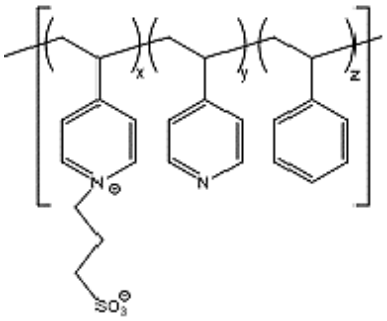
z is 0 to about 20 mol-%.

The disclosure further relates to a liquid composition comprising a polymer having the formula (I) as indicated above,

a crosslinker, and

a solvent.

A further aspect of the present disclosure relates to a liquid composition comprising a polymer having the following formula (I):



(I)

wherein x is about 2 to about 8 mol-%;

y is about 72 to about 98 mol-% and

z is 0 to about 20 mol-%.

a crosslinker, and

a solvent.

The present disclosure relates to a method for manufacturing an analyte sensor, wherein the method comprises the steps:

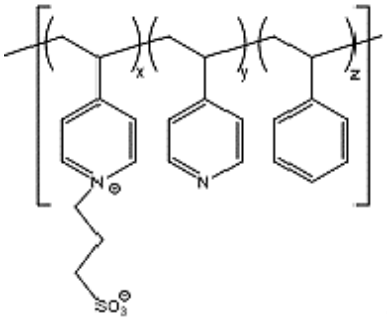
a) providing a substrate comprising a first side and a second side, and at least one working electrode positioned on the first side of the substrate, and

b) forming a layer of a flux-limiting polymer membrane over the at least one working electrode, wherein the flux-limiting polymer membrane comprises a polymer, which has the formula (I) as indicated above.

A further aspect of the present disclosure relates to a method for manufacturing an analyte sensor as described herein comprising the steps:

a) providing a substrate comprising a first side and a second side, and at least one working electrode positioned on the first side of the substrate, and

b) forming a layer of a flux-limiting polymer membrane over the at least one working electrode, wherein the flux-limiting polymer membrane comprises a polymer, which has the following formula (I):



(I)

wherein x is about 2 to about 8 mol-%;

y is about 72 to about 98 mol-% and

z is 0 to about 20 mol-%.

In particular examples, x is about 5 mol %; y is about 85 mol % and z is about 10 mol %.

Definitions

As used in the following, the terms “have”, “comprise” or “include” or any arbitrary grammatical variations thereof are used in a non-exclusive way. Thus, these terms may both refer to a situation in which, besides the feature introduced by these terms, no further features are present in the entity described in this context and to a situation, in which one or more further features are present. As an example, the expressions “A has B”, “A comprises B” and “A includes B” may both refer to a situation in which, besides B, no other element is present in A (i.e. a situation in which A solely and exclusively consists of B) and to a situation in which, besides B, one or more further elements are present in entity A, such as element C, elements C and D or even further elements.

Further, it shall be noted that the terms “at least one”, “one or more” or similar expressions indicating that a feature or element may be present once or more than once typically will be used only once when introducing the respective feature or element. In the following, in most cases, when referring to the respective feature or element, the expressions “at least one” or “one or more” will not be repeated, non-withstanding the fact that the respective feature or element may be present once or more than once.

Further, as used in the following, the terms "preferably", "more preferably", "particularly", "more particularly", "specifically", "more specifically" or similar terms are used in conjunction with optional features, without restricting alternative possibilities. Thus, features introduced by these terms are optional features and are not intended to restrict the scope of the claims in any way.