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(54) Title (EN): FLUORESCENT PROBE FOR DETECTING NITROREDUCTASE, PREPARATION METHOD THEREFOR AND USE THEREOF IN ENZYMATIC REACTION

(54) Title (FR): SONDE FLUORESCENTE POUR LA DÉTECTION DE NITRORÉDUCTASE, SON PROCÉDÉ DE PRÉPARATION ET SON UTILISATION DANS UNE RÉACTION ENZYMATIQUE

(54) Title (ZH): 一种检测硝基还原酶的荧光探针及其制备方法与酶促反应的应用

(57) Abstract:

(EN): Disclosed are a fluorescent probe for detecting a nitroreductase, a preparation method therefor and the use thereof in an enzymatic reaction, wherein same fall within the technical field of industrial analysis and detection. The fluorescent probe is 3-(4-(2-(4'-(diphenylamino)-3-((4-nitrobenzyl)oxy)-[1,1'-biphenyl]-4-yl)vinyl)quinoline-1-bromo)propane-1-sulfonate. The probe compound of the present invention enhances the hydrophilicity thereof by introducing hydrophilic groups such as sulfonates and quinoline salts, and performs 1,6-rearrangement and elimination reactions under the catalysis of a nitroreductase (NTR) to generate a hydroxyl, and realizes the detection and analysis of NTR in an enzymatic reaction by means of fluorescence variations triggered by an intramolecular charge transfer (ICT) effect. The method has the advantages of being simple to prepare, a high yield, and being suitable for detecting the content of a high-concentration enzyme in an enzymatic reaction, and also exhibits great application prospects in the enzyme detection field for enzymatic reaction systems in the field of chemistry.

(FR): L'invention concerne une sonde fluorescente permettant de détecter une nitroréductase, son procédé de préparation et son utilisation dans une réaction enzymatique, se rapportant au domaine technique de l'analyse et de la détection industrielles. La sonde fluorescente est du 3-(4-(2-(4'-(diphénylamino)-3-((4-nitrobenzyl)oxy)-[1,1'-biphényl]-4-yl)vinyl)quinoléine-1-bromo)propane-1-sulfonate. Le composé de la sonde selon la présente invention améliore le caractère hydrophile de celle-ci par introduction de groupes hydrophiles tels que des sulfonates et des sels de quinoléine, et effectue des réactions de réarrangement et d'élimination sous catalyse d'une nitroréductase (NTR) pour générer un hydroxyle, et réalise la détection et l'analyse de NTR dans une réaction enzymatique au moyen de variations de fluorescence déclenchées par un effet de transfert de charge intramoléculaire (ICT). Le

procédé présente des avantages en termes de simplicité de préparation, d'un rendement élevé, et d'être approprié pour détecter la teneur d'une enzyme à haute concentration dans une réaction enzymatique, le procédé présente également de grandes perspectives d'application dans le domaine de la détection d'enzymes pour des systèmes de réaction enzymatique dans le domaine de la chimie.

(ZH): 本发明公开了一种检测硝基还原酶的荧光探针及其制备方法与酶促反应的应用,属于工业分析检测技术领域。所述荧光探针为 3-(4-(2-(4'-(二苯胺基)-3-((4- 硝基苄基) 氧基)-[1,1'- 联苯基]-4- 基) 乙烯基) 喹啉 -1- 溴) 丙烷 -1- 磺酸盐。本发明的探针化合物通过引入亲水性基团磺酸根和喹啉盐类增强其亲水性,在硝基还原酶(NTR)的催化下发生 1,6-重排和消除反应,生成羟基,通过分子内电荷转移效应(ICT)引发的荧光变化来实现对酶促反应中 NTR 的检测分析。该方法具有制备简便、产率较高、且适用于检测酶促反应中高浓度酶含量等优点,在化工领域中的酶促反应体系酶检测领域显示了极大的应用前景。

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