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[Continued on next page]

(54) Title: NANOPORE DEVICE FOR REVERSIBLE ION AND MOLECULE SENSING OR MIGRATION

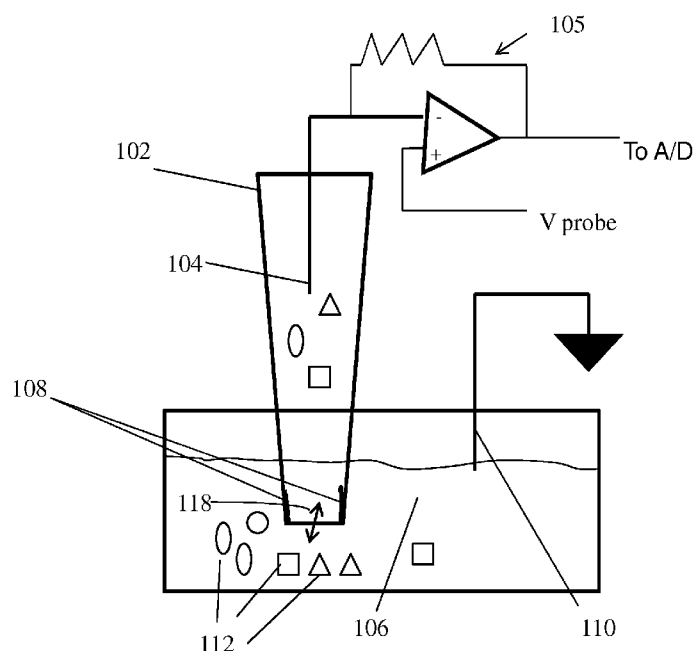


Fig. 1

(57) Abstract: Disclosed are methods and devices for detection of ion migration and binding, utilizing a nanopipette adapted for use in an electrochemical sensing circuit. The nanopipette may be functionalized on its interior bore with metal chelators for binding and sensing metal ions or other specific binding molecules such as boronic acid for binding and sensing glucose. Such a functionalized nanopipette is comprised in an electrical sensor that detects when the nanopipette selectively and reversibly binds ions or small molecules. Also disclosed is a nanoreactor, comprising a nanopipette, for controlling precipitation in aqueous solutions by voltage-directed ion migration, wherein ions may be directed out of the interior bore by a repulsing charge in the bore.



TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: nanopipette, nanopore, coating

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SENKEI UMEHARA et al. "Current Rectification with Poly-l-Lysine-Coated Quartz Nanopipettes" Nano letters, October, 2006, Vol. 6, No. 11, pp. 2486-2492. See abstract, fig. 2, and page 2487.	1-29
A	US 2010-0072080 A1 (KARHANEK MILOSLAV et al.) 25 March 2010 See abstract, claims 1, 18, and figs. 1-3, 9.	1-29
A	MILOSLAV KARHANEK et al. "Single DNA molecule detection using nanopipettes and nanoparticles" Nano letters, January, 2005, Vol. 5, No. 2, pp. 403-407. See abstract and pages 404-407.	1-29



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None