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Supplementary file

Toward the Development of Smart and Low Cost Point-of-Care Biosensors Based on Screen

Printed Electrodes

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Table 1: List of a number of companies involved in manufacturing and marketing of SPDB in recent years.

Company/Institute Name/Country	Electrode Materials (Working/Counter)	Usual Dimension	Recent Publications	Website
Biodevice Technology Co. Ltd. Japan	Carbon, Gold, Silver/Silver Chloride	L: 12.5 mm Width: 4 mm Thickness: 0.3 mm	(Yamanaka et al, 2011; Saito et al, 2008; Ahmed et al, 2013)	www.biodevicetech.com
BST Biosensor Technology GmbH, Germany	Carbon, Gold, Silver/Silver Chloride	Length : 25.4 mm Width : 7 mm Thickness : 0.635 mm	(Marc et al, 2011; Dieter et al, 2011)	www.bst-biosensor.de
BVT, Czech Republic	Carbon, Gold, Silver/Silver Chloride	Length: 25.40 mm Width: 7.26 mm Thickness: 0.63 mm	(Sejnovova et al, 2011)	www.bvt.cz
DEK International, Switzerland	Graphite, Gold, Platinum, Silver	Not Available		http://www.dek.com/dek.nsf/dek/global_switzerland
DropSens, Spain	Carbon, Gold, Silver/Silver Chloride, Various nanoparticles, Nickel oxide, Mesoporous carbon, Prussian blue, single and multi-wall carbon nanotube, Bismuth oxide, carbon nanotube, metal oxide and mediators (mendola blue and co-phthalocyanite)	Length: 34.0 cm Width: 10 mm Thickness: 0.5 mm	(Situ et al, 2013; Zhang et al, 2013)	www.dropsens.com
Gwent Electronic Materials Ltd., UK	Carbon, Gold, Platinum,	Length: 25 mm Width: 15 mm Thickness: 4 mm	(Riches et al, 2009)	www.gwent.org
Kanichi Research, UK	Carbon, Gold, Silver/Silver Chloride, Various nanoparticles, Bismuth oxide, carbon nanotube, metal oxide and mediators (mendola blue and co-phthalocyanite)	Length: 40 mm Width: 10 mm Thickness: ?	(Khairy et al, 2010; Sljukic et al, 2011; Nian et al, 2012)	www.kanichi-research.com/
PINE Research Instrumentation, USA	Carbon on PET, Gold on ceramic, Platinum on ceramic, Silver/Silver Chloride as reference	Length: 61 mm Width: 15 mm Thickness: 0.36 mm (PET substrate); 0.67 mm (ceramic substrate)	(Nian et al, 2012; Allen et al, 2013; Strojnik et al, 2011)	www.pineinst.com
Rusens Limited, Russia	Graphite paste. Reference electrode is made of Ag/AgCl paste.	Length: 28 mm Width: 10 mm Thickness: 0.35 mm	(Alina et al, 2012)	www.rusens.com
Suzhou Deltabiotech. Ltd, China	Multiwall carbon nanotube and graphene	Length: ? Width: 3-6 mm Thickness: 0.25 mm	-	http://www.made-in-china.com/showroom/liuying2007n/companyinfo/Suzhou-Deltabiotech-Ltd-.html
Zensor, Taiwan	Single-E, Three-E, Nano-copper SE, Nano-copper modified SPE	Working Diameter/Area : 3 mm / 0.031cm ²	(Ling et al, 2011)	www.zensor.com.tw

Table 2: Matrix of applications

		Electrode Modifiers				
		Enzyme	Antibody	Antigen	DNA	Cell/Protein
Food industry	Adsorption	Alcohol dehydrogenase (Wang,1995); Alcohol oxidase (AOX) (Rama,2012)	Anti domoic acid (Micheli et al, 2004), Anti-aflatoxin B1 (Pemberton et al, 2006)	Tissue transglutaminase (Ttg) (Neves et al, 2013)	Single- stranded oligonucleotides (Marrazza et al, 2000)	<i>A. nicotianae</i> (Schmidt et al, 1996)
	Affinity	D-lactate /aldehyde dehydrogenase (Avramescu et al, 2002)	Anti-aflatoxin M1 (Micheli et al, 2005)		DNA anti- <i>V. Cholera</i> (Yean et al, 2008)	
	Covalent	Horse-radish peroxidase (Gao et al, 2011)	Acetochlor (Ferreira et al, 2006), Ig G anti <i>S. typhimurium</i> (Salam et al, 2009); Anti- <i>E. coli</i> , anti-campylobacter and anti-salmonella antibodies (Viswanathan et al, 2012); Anti Casein Antibody (Saito et al, 2008)		DNA anti- <i>Salmonella</i> (Giallo et al, 2005)	bacteriophage endolysin- (Tolba et al, 2012)
	Entrapment	Lactate and malate dehydrogenase (Albareda-Sirvent et al, 2002), Aldehyde dehydrogenase (Noguer et al, 2004), Alcohol oxidase (Patel et al, 2001)	Ig G anti- <i>V. parahaemolyticus</i> (Zhao et al, 2007)			Bacterial mutants of Escherichia coli K12 (Held et al, 2002)
	Others				Immobilization free DNA (amplicon) detection; Species specificity (14).DNA of GMO (Ahmed et al, 2009), Food borne Pathogen (Ahmed et al, 2013);	
Environment	Adsorption	Organophosphorus hydrolase (Mulchandani et al, 1999), Sulfite oxidase (Hart et al, 2002), Acetylcholinesterase (Crew et al, 2004), Coprinus cinereus peroxidase (Savizi, et al, 2012)	Anti-phenantrene (Fahnrich et al, 2003)		double-stranded calf thymus DNA (Lucarelli et al, 2002)	Pseudomonas (Skladal et al, 2002), <i>Shewanella sp.</i> (Sudhakara et al, 2009)
	Affinity	Acetylcholinesterase (Bucur et al, 2004)	Ig G anti <i>E. Coli</i> (Cho et al, 2008)		DNA anti- <i>E. coli</i> (Loaiza et al, 2008)	
	Covalent	Glutamate deshydrogenase (Hart et al, 1999), lactase, peroxidase & tyrosinase (Solna et al, 2005)	Anti-2,4-dichlorophenoxyacetic acid (Dequaire et al, 1999) , Ig G anti- <i>phenoxyalkanoic acid</i> (Kasna et al, 2003)		DNA anti <i>S. enterica</i> (Farabullini et al, 2007)	<i>P. putida</i> (Timur et al, 2004), photosynthetic reporter cell (Bhalla et al, 2011)
	Entrapment	Laccase (Tortolini et al, 2010) Nitrate reductase (Quan et al., 2005), acetylcholinesterase (Quan et al, 2005), Sulfite oxidase (Abass et al, 2000)	Ig anti- <i>L. Monocytogenes</i> (Tully et al, 2008)			

Biomedical	Adsorption	Glucose oxidase (Chen et al, 2002), Alcohol oxidase (Boujtita et al, 2000)	Anti-estradiol (Pamberton et al, 2006), Ig G anti <i>H. Pylori</i> / (Michelli et al, 2005), anti-Aflatoxin B1(Ferreira et al, 2006)		Single-stranded nucleic acid-modified strips (Giallo et al, 2005)	<i>Pseudomonas</i> (Skladal et al, 2002)
	Affinity	D-lactate /L-lactate/aldehyde dehydrogenase (Gao et al, 2011) Glucose Oxidase (GOx)-SWCNT conjugates, (Albareda-Sirvent et al, 2002);	Anti-progesterone (Hart et al, 1997), Ig G anti <i>S. Pneumoniae</i> (Salam et al, 2009) Monoclonal mouse IgG anti-CA125 antibody (Viswanathan et al, 2012)		DNA anti- <i>S. pneumoniae</i> (Held,2002)	
	Covalent	cytochrome-P450scc (Noguer et al, 2004),)	Protein of <i>Trypanosoma cruzi</i> (Zhao et al, 2007), anti-heart-type fatty acid-binding (FABP) (Neves et al, 2013)		Oligonucleotide (Mulchandani et al, 1999)	
	Entrapment	Aldehyde dehydrogenase (Gao et al, 2011)	Anti- α -1-fetoprotein (Marrazza et al, 2000), Plastic Antibody (Molecularly imprinted membrane) for ractopine (Zhang et al, 2013) HRP-anti- <i>E. coli</i> O157:H7 and HRP-anti- <i>E. sakazakii</i> (Yean et al, 2008)			Bacterial mutants of <i>Escherichia coli</i> K12 (Held et al, 2002)
	Others				Immobilization free DNA detection on a microfluidics chips. (Hart et al, 2002). SNP detection (Ahmed et al, 2007)	

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