

Supplementary data for the article:

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## **Analytical & Bioanalytical Chemistry**

### **Electronic Supplementary Material**

#### **Microscopic imaging and tuning of electrogenerated chemiluminescence with boron-doped diamond nanoelectrode arrays**

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### Microfabrication of the markers on the MNEAP

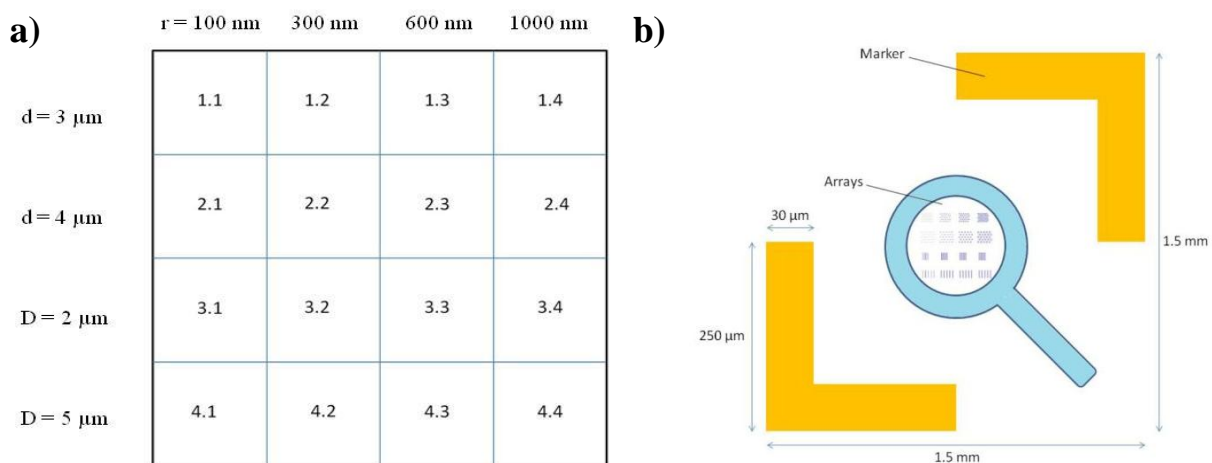
The markers generated on BDD in order to easily locate the arrays with the microscope were obtained as follows. A PMMA 671.05 layer was spin-coated at 5000 rpm for 1 minute on a BDD substrate and subsequently annealed at 170 °C for 15 minutes. In Table S1 are listed relevant experimental conditions.

**Table S1** Experimental parameters used for the markers exposure

<b>Dose</b>	400 $\mu\text{C}/\text{cm}^2$
<b>Aperture</b>	300 $\mu\text{m}$ (mag 220)
<b>Bake</b>	170 °C for 15 minutes
<b>Current</b>	310 pA
<b>Developer</b>	MIBK:IPA=3:1
<b>Temperature</b>	RT

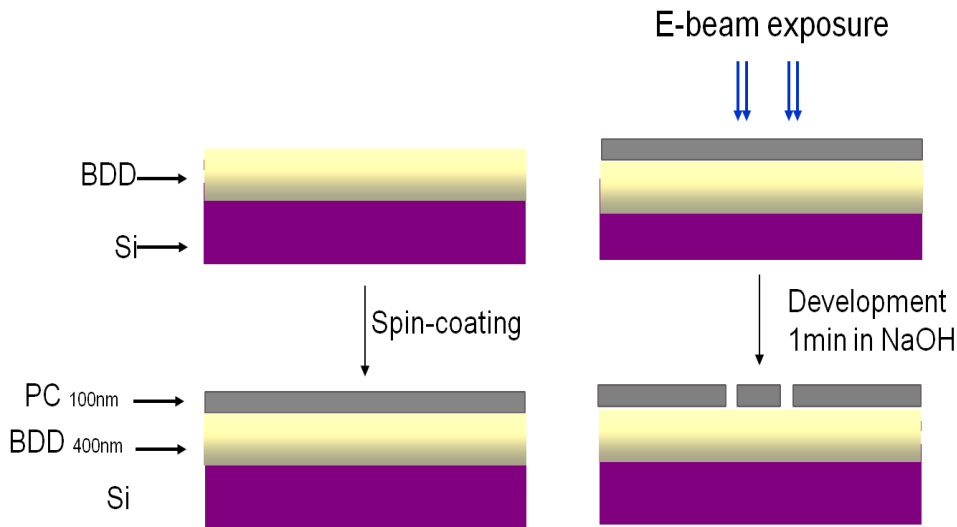
After development, samples were evaporated with 30 nm of chromium, followed by lift off in hot  $(\text{CH}_3)_2\text{CO}$  in order to obtain BDD substrate with metallic markers.

Fig.S1a reports the identification key of the NEAs in the platform and Fig. S1b shows the scheme of the whole sample area fabricated for ECL experiment, including the markers.



**Fig. S1** a) Identification key of the NEAs in the platform; b) Scheme of the whole sample area

After treatment with O<sub>2</sub> plasma for 15 seconds and deposition of a layer of PC by spin coating, the structures were exposed by EBL following the scheme shown in Fig. S2, using the parameters reported in Table S2.

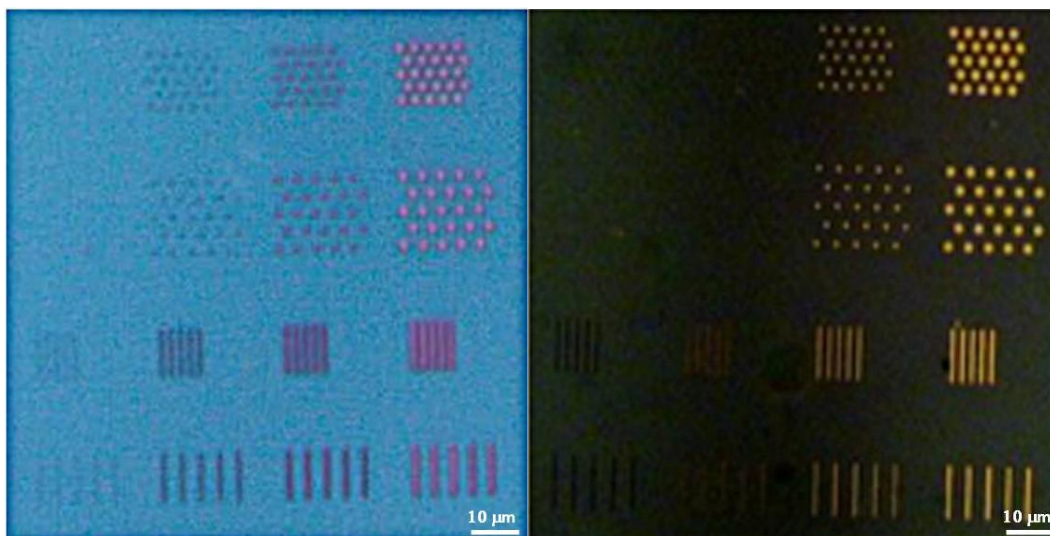


**Fig. S2** Schematic representation of the e-beam writing steps of BDD nanodisk arrays

**Table S2** Conditions used for the microfabrication of the MNEAP

<b>Resist</b>	PC 3% in Cyclopentanone
<b>Spin Speed</b>	2000 rpm
<b>Annealing</b>	180 °C for 30 minutes
<b>Dose</b>	8000 $\mu\text{C}/\text{cm}^2$
<b>Development</b>	1 min in 5M NaOH at 35 °C

## Optical microscopy characterization of the MNEAP



**Fig. S3** Optical microscope images of the MNEAP in bright field (left) and in dark field (right)

## Calculation of the thickness of the ECL reaction layer

**Table S3** Thickness  $\mu$  of the ECL reaction layer calculated for different TPrA concentrations and different disk radii using Eq. 6

[TPrA] (M)	Thickness of the ECL reaction layer ( $\mu\text{m}$ )			
	$r = 100 \text{ nm}$	$r = 300 \text{ nm}$	$r = 600 \text{ nm}$	$r = 1000 \text{ nm}$
0.001	0.098	0.28	0.53	0.81
0.003	0.096	0.27	0.48	0.71
0.005	0.095	0.26	0.46	0.66
0.01	0.093	0.25	0.42	0.58
0.03	0.089	0.22	0.34	0.44
0.085	0.082	0.18	0.26	0.32