Supporting Information

Zinc oxide nanorods functionalized paper for protein preconcentration in biodiagnostics

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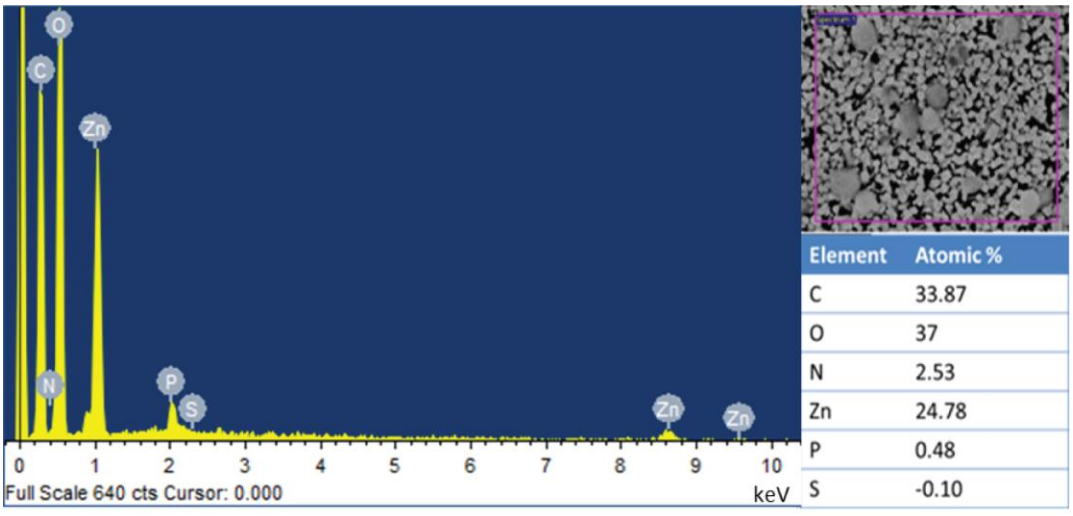
S1. EDX spectroscopic study:



Element	Atomic %
C	33.87
O	37
N	2.53
Zn	24.78
P	0.48
S	-0.10

Figure S1: EDX spectra of ZnO-NRs/WFP showing atomic concentration of different elements.

S2. Nanorods on paper area and density calculation:

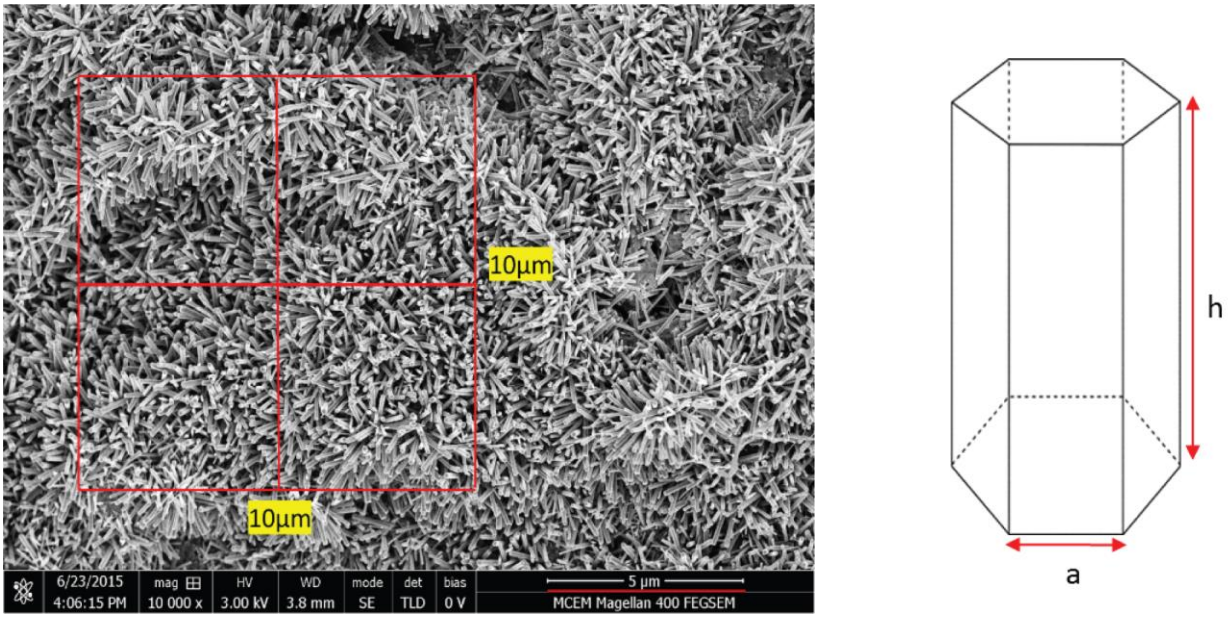


Figure S2: SEM image of ZnO-NRs/WFP and shape of individual rod obtained from SEM and used for calculations.

2.1 Surface area calculation:

Shape of nanorod is like hexagonal prism

Parameter calculated from SEM image:

No. of nanorods in 100µm^2 is 1000

Height(h): 1µm

Diagonal(D): 200nm

Edge length(a): D/2= 100nm

Area of a hexagonal prism= $3\sqrt{3}a^2 + 6ah$

Hence, area of one nanorod = 6.5x10^{-13} m^2 = 0.65µm^2

Area of 1000 rods will be= 650 µm^2

2.2 No. of nanorods/m^2 calculation:

Approximate no. of nanorods in 100um^2 area is 1000(from SEM image).

No. of rods/m^2 will be:

#rods in $10^{-4}m^2$ is =1000, assuming uniform distribution

In $1m^2 = 1000/10^{-4} = 10^7$ rods/m^2

So, density of rods= 10^7 rods/m^2

Surface coverage of paper by nanorods is about 90% as seen by SEM images.

Therefore, increase in surface area will be= density of rods x area of one rod

$$= 6.5 \times 10^{-13} \times 10^7$$

$$= 6.5 \times 10^{-6}\ m^2 \text{ or } 6.5 \times 10^6 \mu m^2$$

$$= 7 \times 10^6\ \mu m^2$$

S3. Relation with increase in fluorescence

Sample	**Average Intensity**
WFP	6440184
ZnO-NRs/WFP	22101495

Percent increase in fluorescence intensity=

$$\frac{FinalIntensity - InitialIntensity}{InitialIntensity} x100$$

Which gives,

= 22101495-6440184/6440184*100

> 200% increase in fluorescence.