

## Supporting Information

### Improved photocatalytic activity and enhanced germination rate of *Oryza Sativa* and urea sensor development utilizing fabricated NiO·SrCO<sub>3</sub>·ZnO nanomaterials

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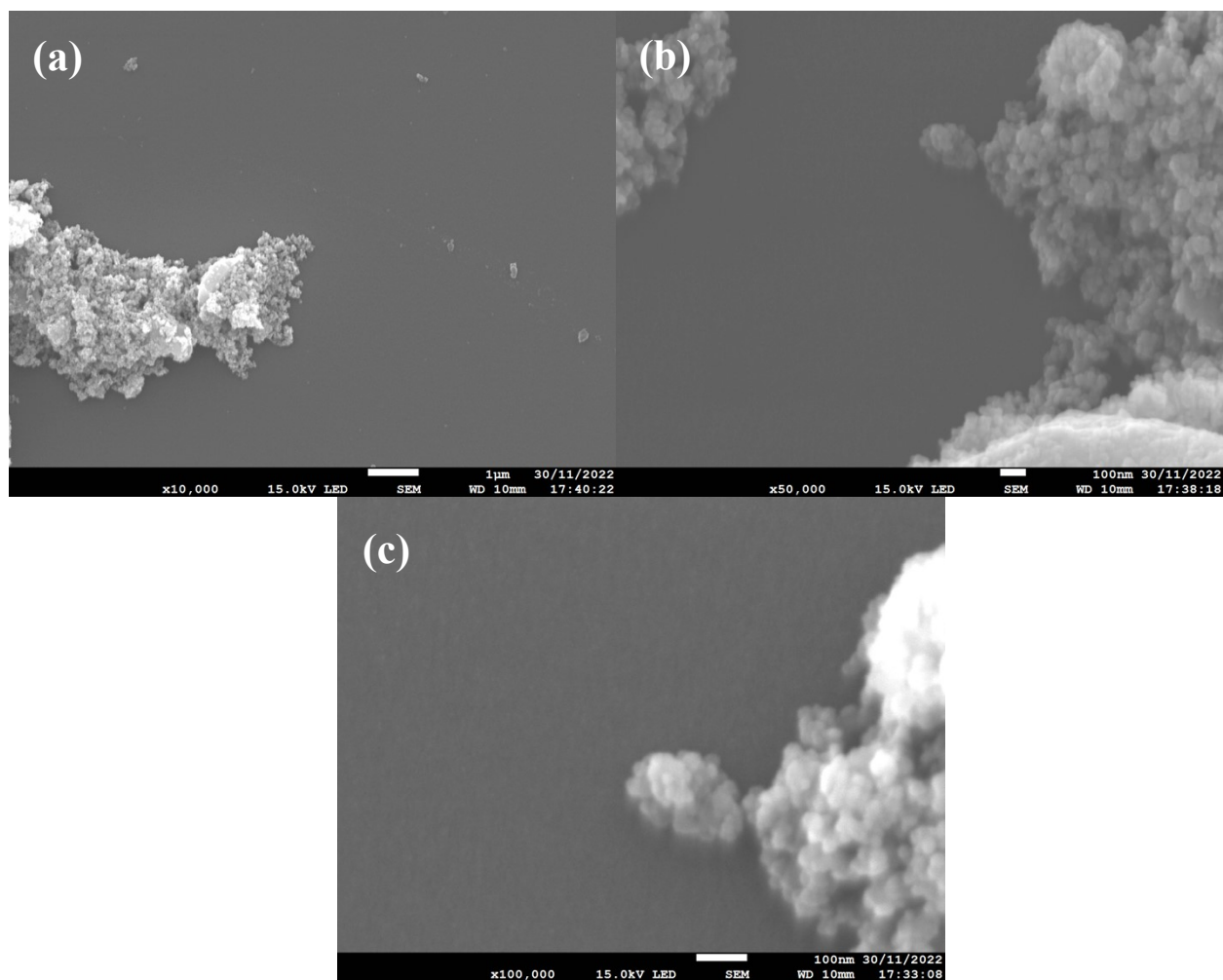
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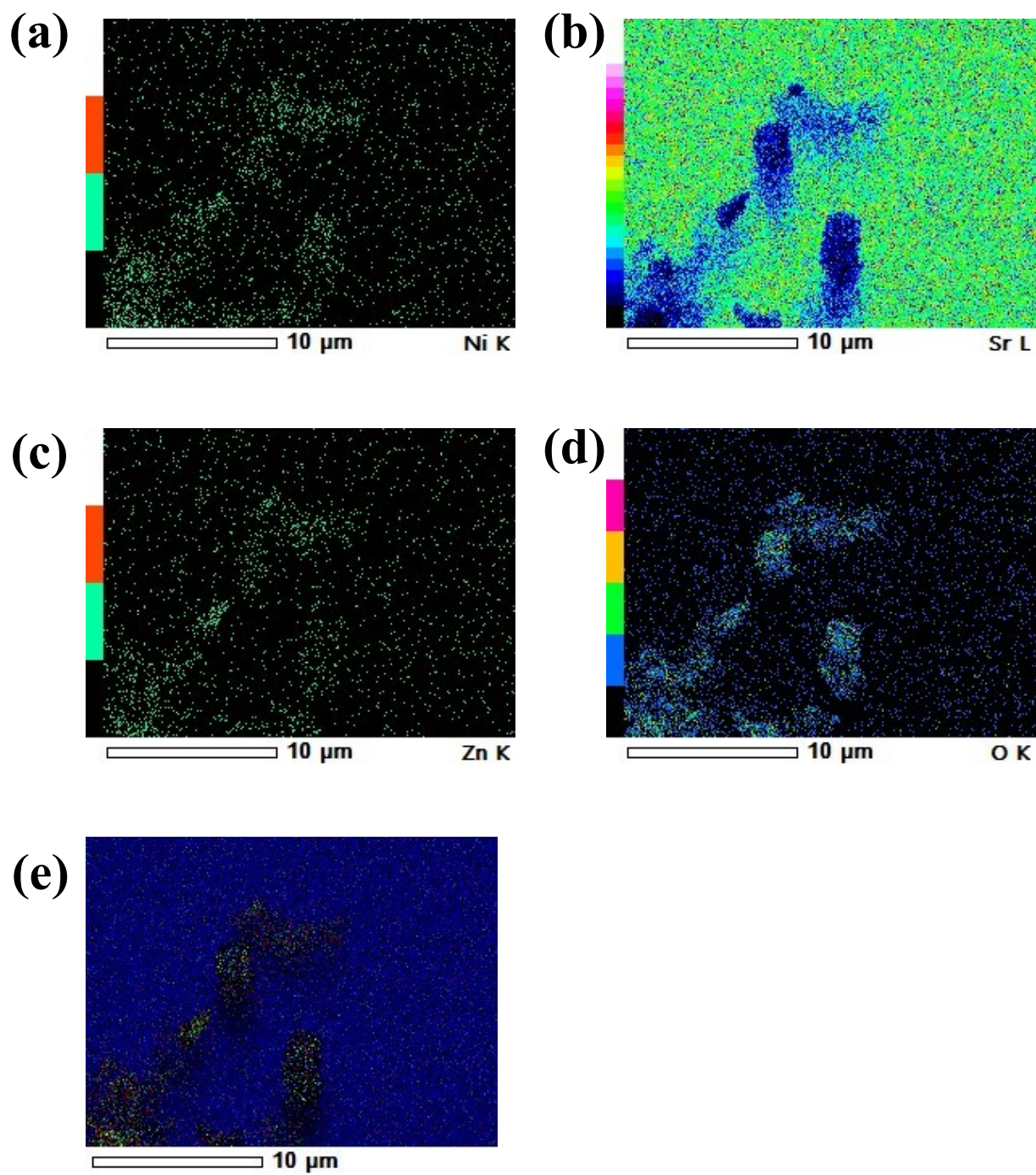
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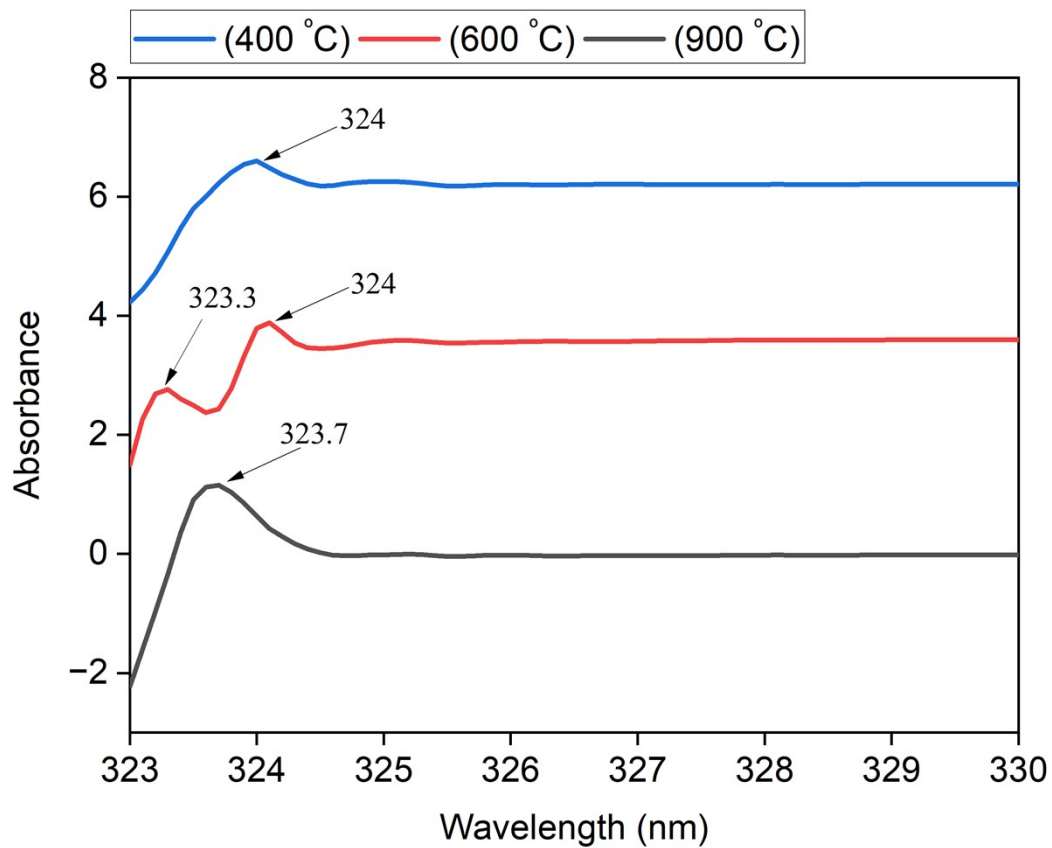
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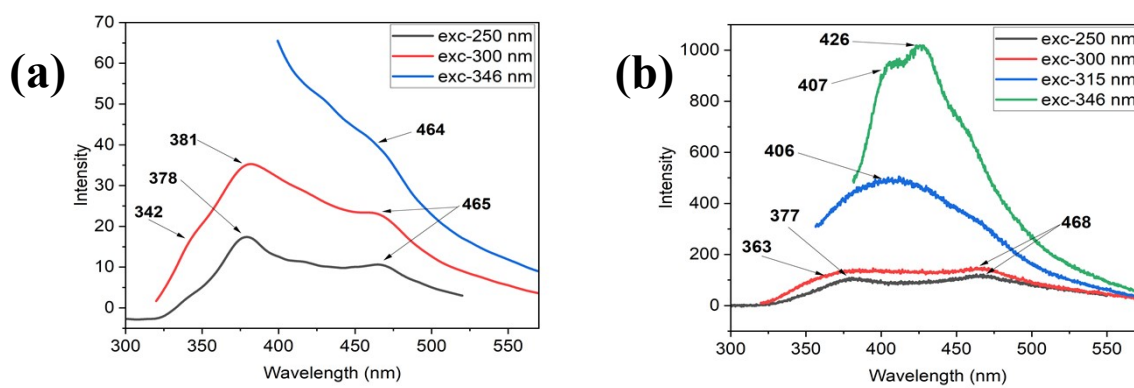
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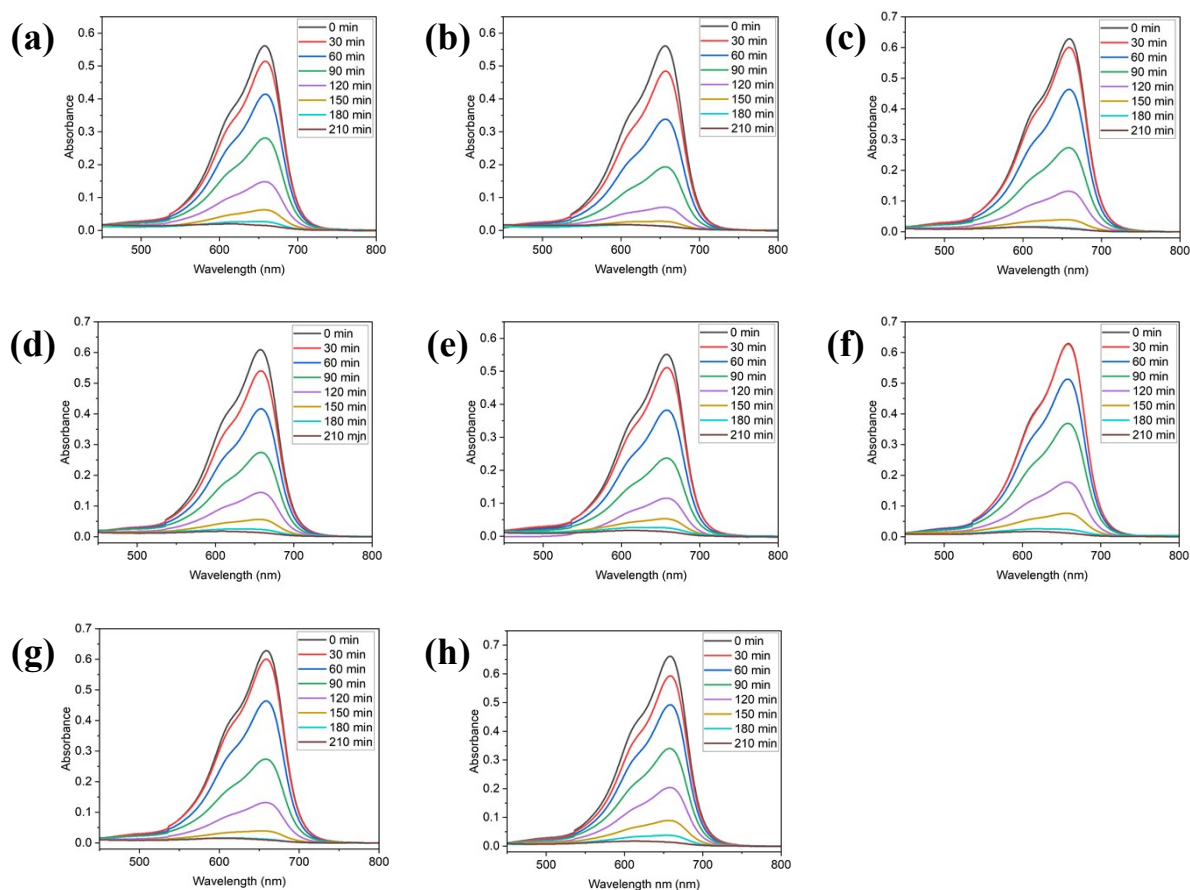
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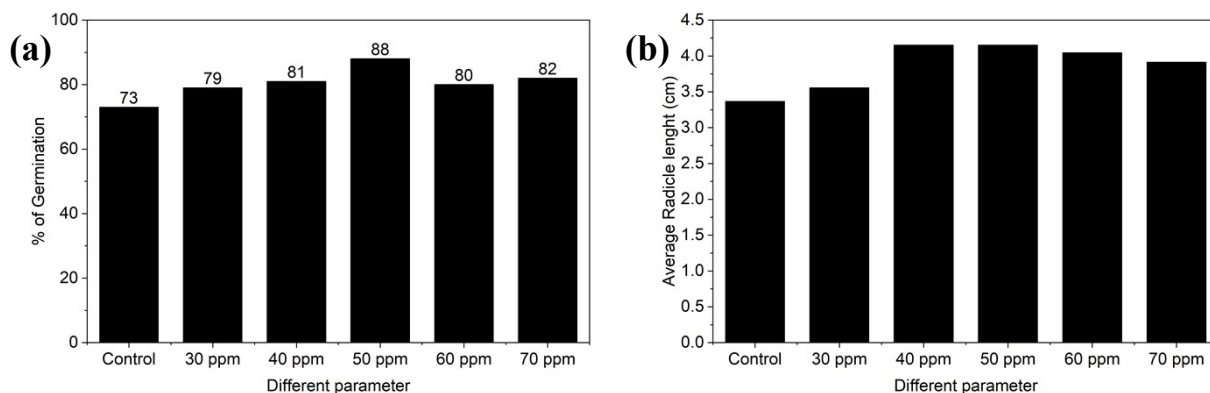
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**Figure S6.** *Oryza sativa* (a) germination percentage and (b) average length of radicle using different concentrations of NiO·SrCO<sub>3</sub>·ZnO NMs

**Table S1.** I and RIR value of components (information were listed from MDI Jade 6.5 software)

Component	I value	RIR value
NiO	12048	4.74
SrCO <sub>3</sub>	35379	3.8
ZnO	22473	5.53

**Table S2.** PL spectra of NiO·SrCO<sub>3</sub>·ZnO NMs compared with single oxide calcined at 600 °C temperature.

	Excitation Wavelength (nm)	Emission Wavelength (nm)
NiO·SrCO <sub>3</sub> ·ZnO	250	382, 466
	300	344, 382, 466
	350	463
NiO	250	373, 459
	307	324, 362, 466
SrCO <sub>3</sub>	300	407
	350	403, 426, 452
ZnO	250	381, 468
	300	343, 381, 468
	350	466

**Table S3.** PL spectra of NiO·SrCO<sub>3</sub>·ZnO NMs at different calcined temperature

Calcined temperature (°C)	Excitation wavelength (nm)	Emission wavelength (nm)
400	250	378, 465
	300	342, 381, 465
	346	464
600	250	382, 466
	300	344, 382, 466
	350	463
900	250	377, 468
	300	363, 468
	315	406
	346	407, 426

Observation	k (min <sup>-1</sup> )	r <sup>2</sup>
pH 4	0.0005	0.666
pH 7	0.0134	0.9301
pH 9.2	0.0225	0.9316

**Table S4.** Values of rate constant (k) and r<sup>2</sup> for dye removal kinetics

**Table S5.** Antibacterial activities of NiO·SrCO<sub>3</sub>·ZnO NMs against pathogenic bacteria

Bacteria culture	Diameter of inhibition zone, D <sub>iz</sub> , (mm)			Diameter of well, D <sub>w</sub> , (mm)	Ratio, R= D <sub>iz</sub> /D <sub>w</sub>		
	1	2	3		1	2	3
<i>Staphylococcus aureus</i>	15	18	18	6	2.5	3.0	3.0
<i>Klebsiella pneumoniae</i>	15	18	17		2.5	3.0	2.83
<i>Pseudomonas aeruginosa</i>	17	18	20		2.83	3.0	3.33
<i>Proteus mirabilis</i>	17	17	17		2.83	2.83	2.83