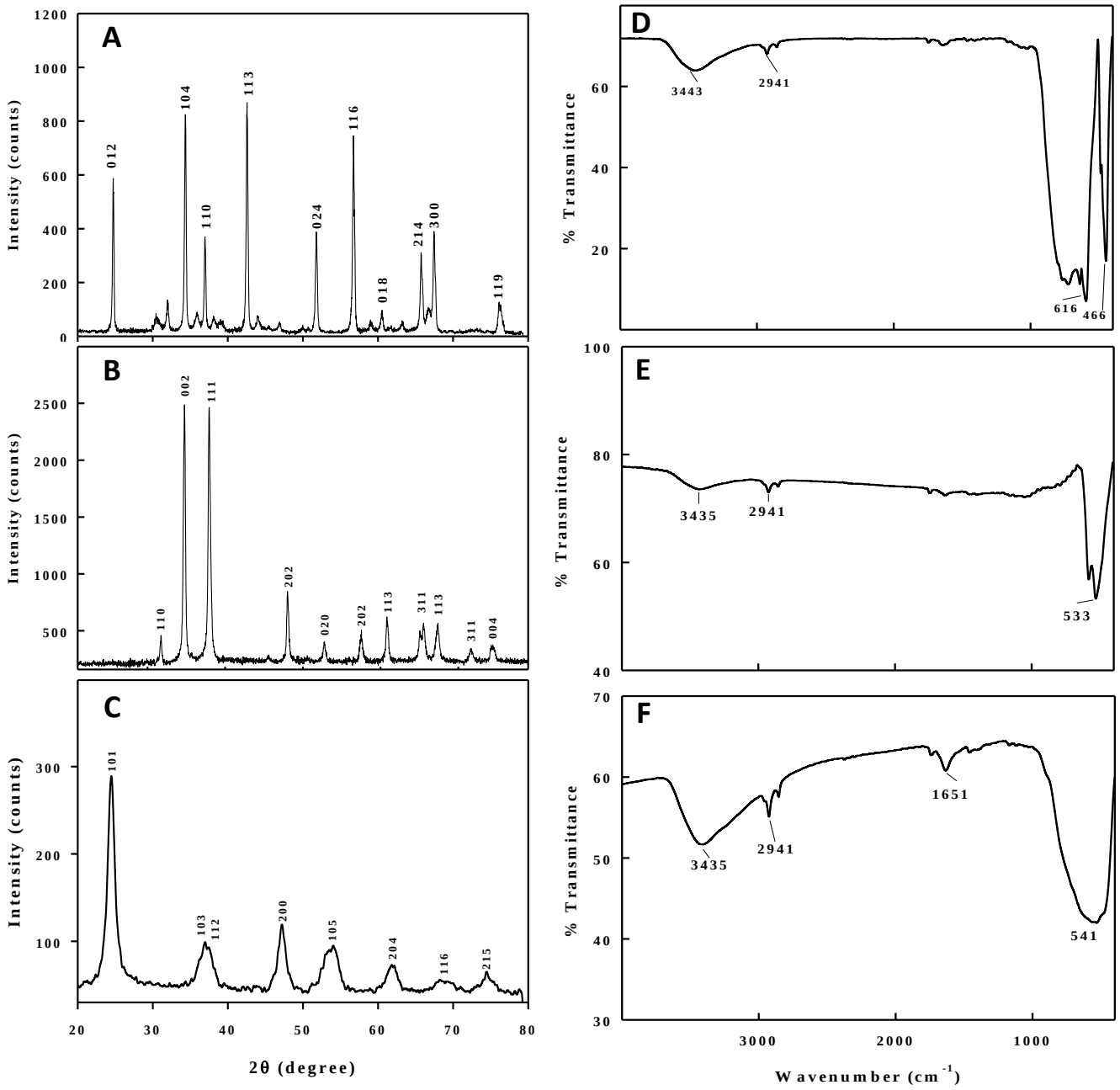
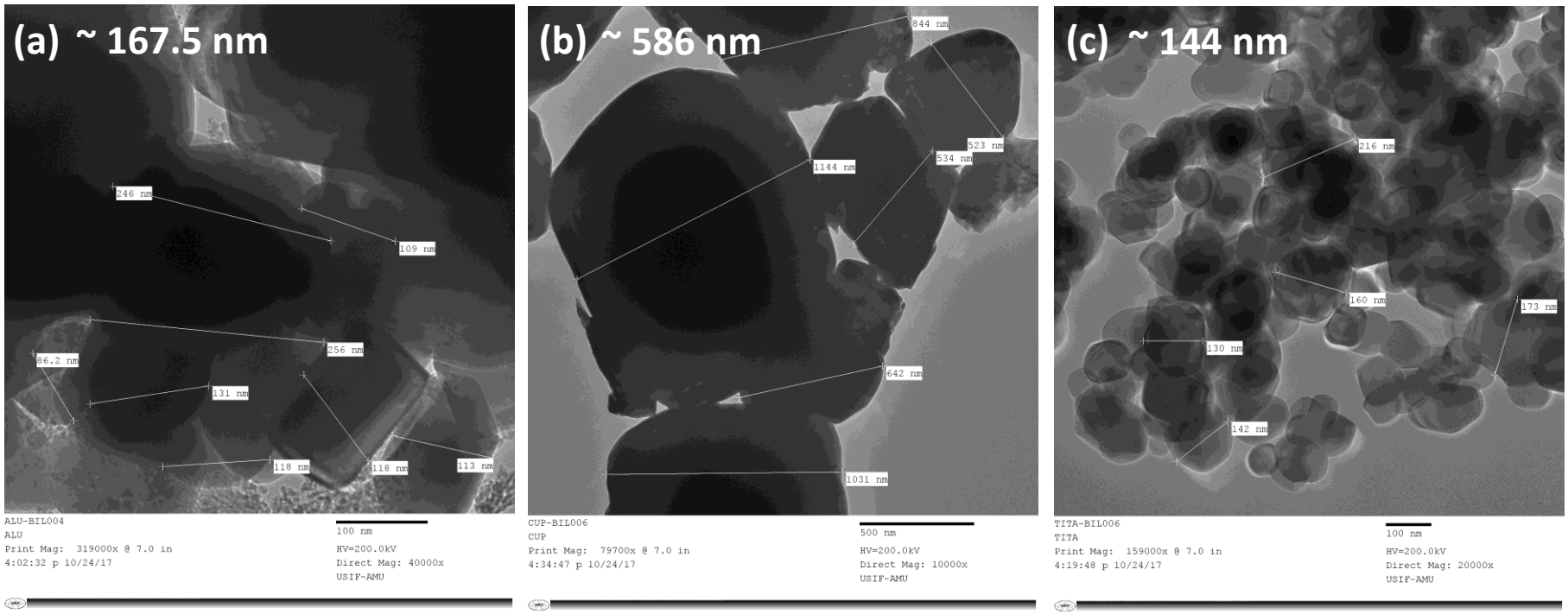
Electronic Supplementary Material (ESI) for Metallomics.

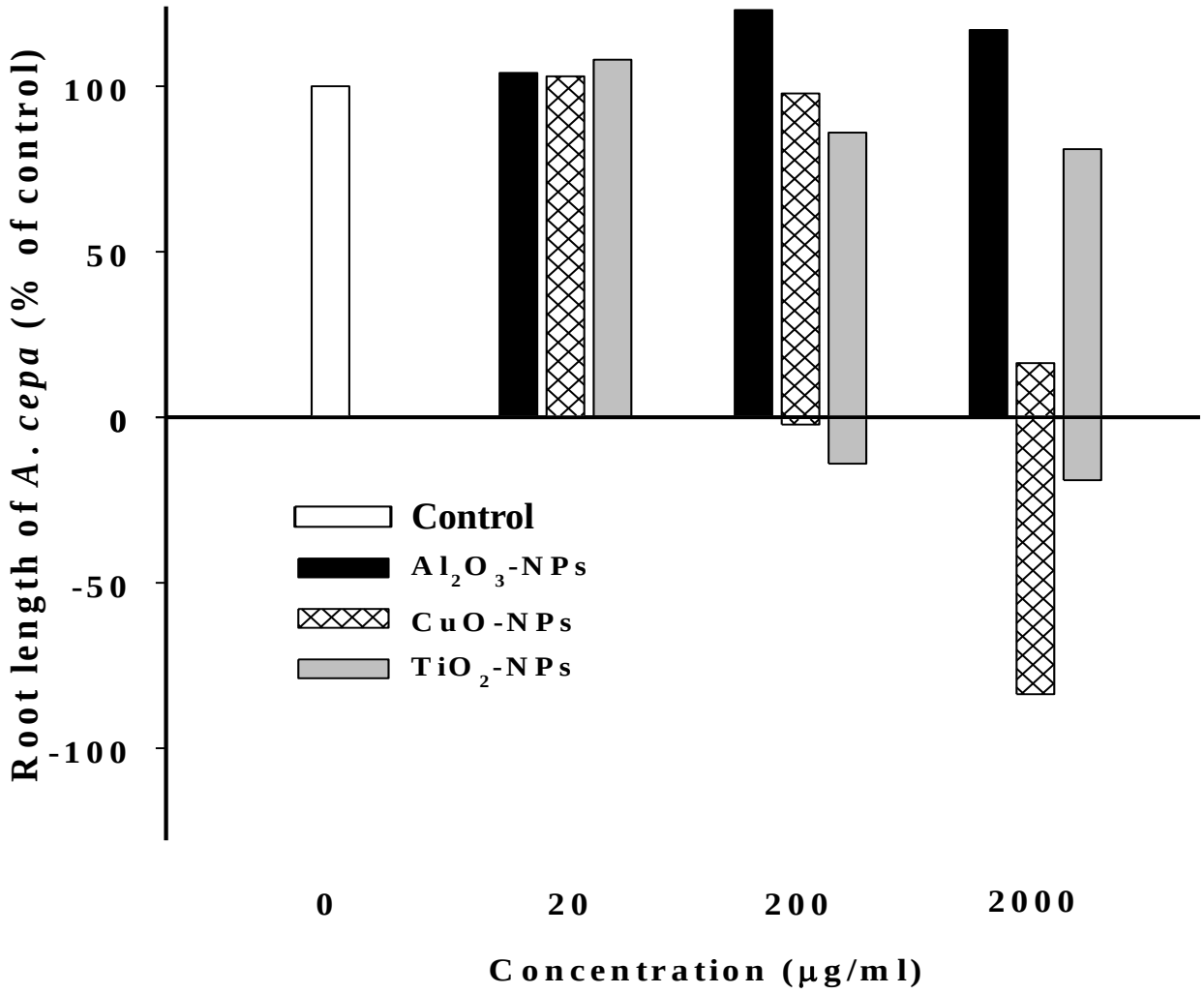
Electronic Supplementary Information



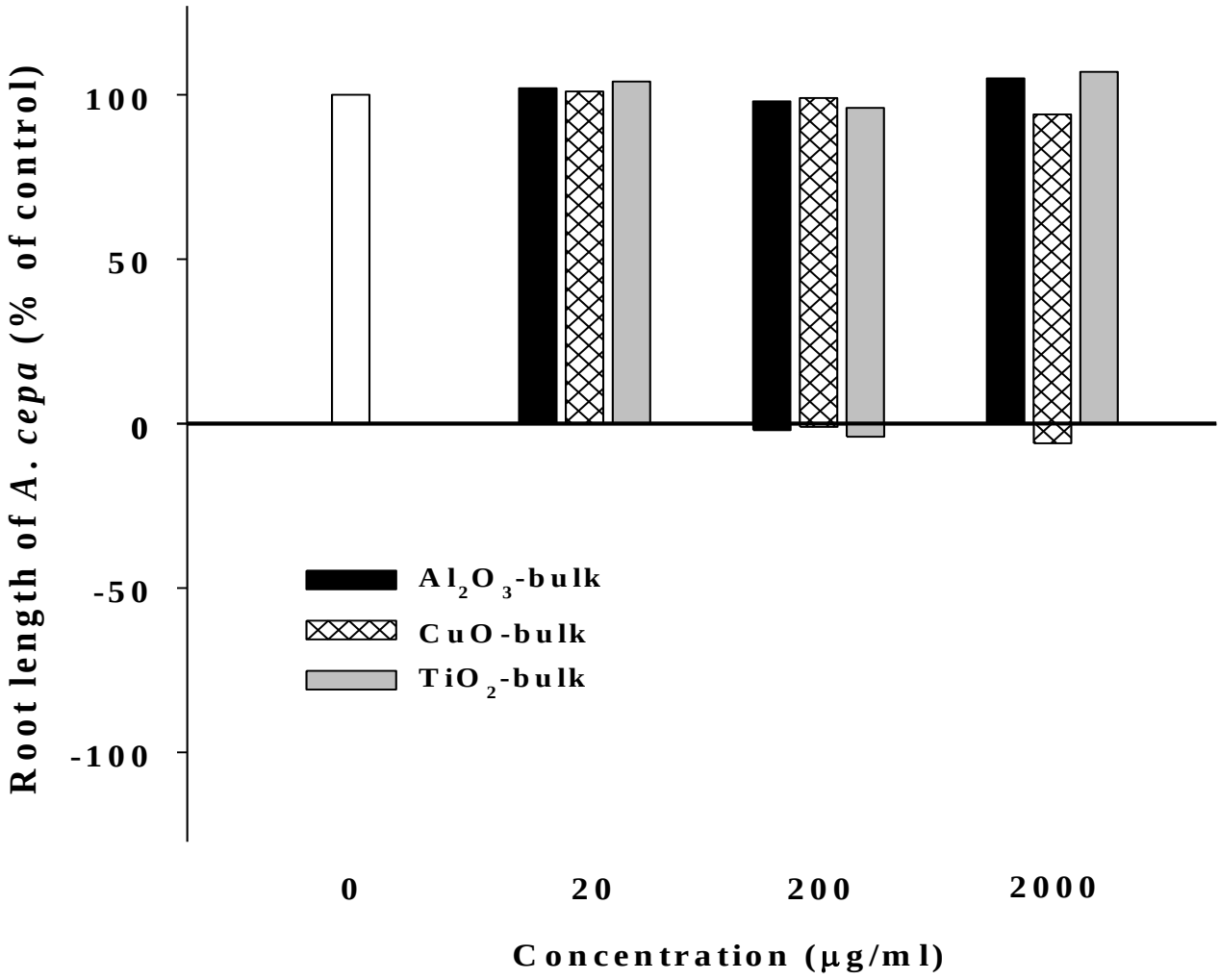
Supplementary figure 1. Characterization of Al_2O_3-NPs, CuO-NPs, and TiO_2-NPs determined by XRD (A-C) and FTIR (D-E).



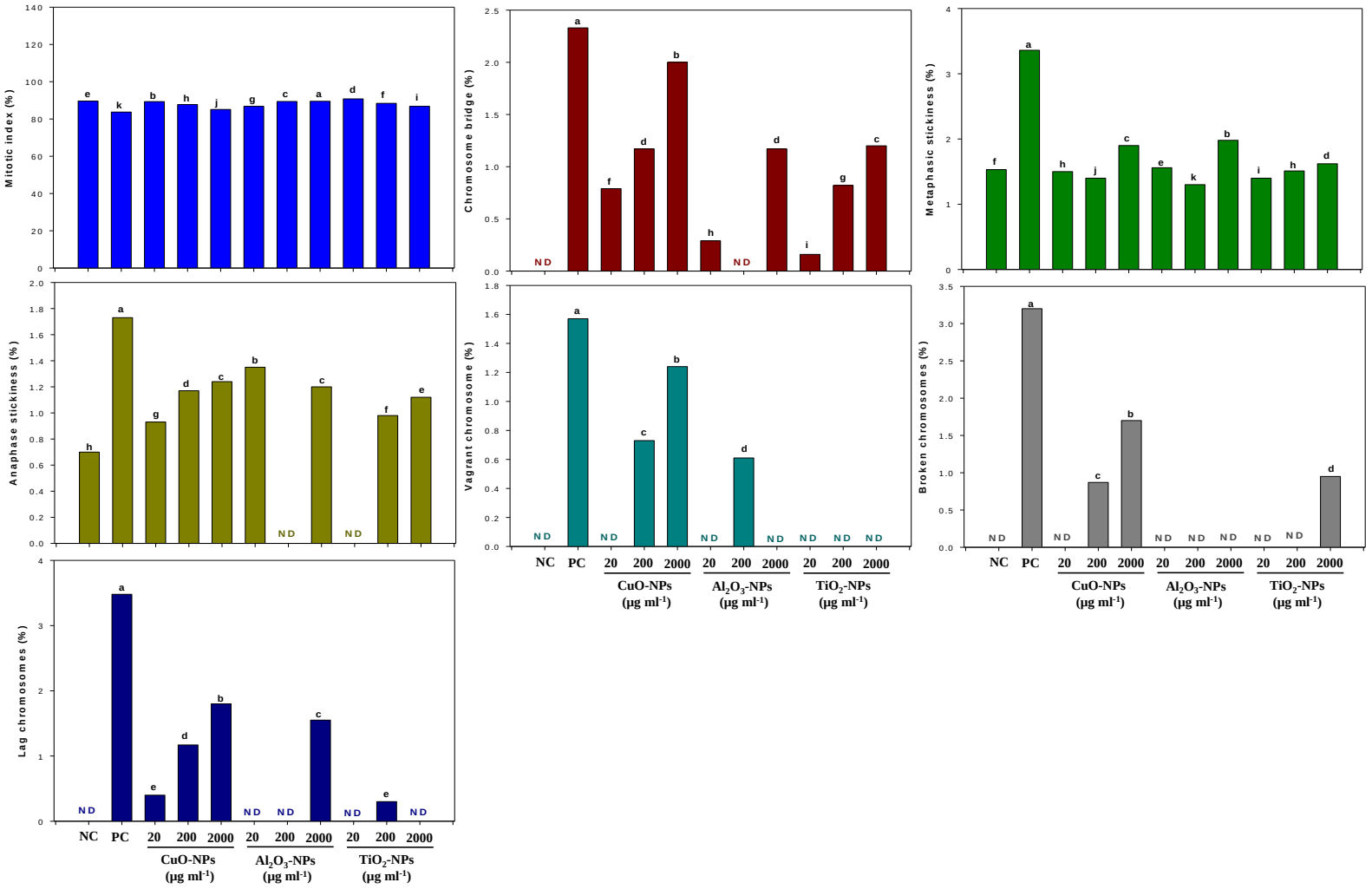
Supplementary figure 2. TEM micrographs of Al_2O_3-bulk (a), CuO-bulk (b), and TiO_2-bulk (c) showing average diameter.



Supplementary figure 3. Percent change in root length of *A. cepa* under Al_2O_3-NPs, CuO-NPs, and TiO_2-NPs stress. Histogram shows % change in root length as a function of NPs concentration taking separate untreated controls as 100 %, under each treatment condition.



Supplementary figure 4. Percent change in root length of *A. cepa* under Al_2O_3-bulk, CuO-bulk, and TiO_2-bulk stress. Histogram shows % change in root length as a function of NPs concentration taking separate untreated controls as 100 %, under each treatment condition.



Supplementary figure 5. Graphical presentation of percent change in mitotic index and various chromosomal aberrations induced by Al_2O_3, CuO-NPs, TIO_2 and EMS (10 mM) in *A. cepa* root meristem cells at different cell division stages. Values are mean of three independent replicates. Mean values followed by different letters are significantly different within a column at $P \leq 0.05$ according to Duncan's multiple range test (DMRT). NC, PC, and ND represent 'negative control', 'positive control', and 'not detected', respectively.

Supplementary Table 1: Dissolution of Al, Cu, and Ti metals ions from their nano-form in aqueous media.

Exposure concentration of NPs (µg ml^{-1})	**Metal ions released from NPs in ½ strength Hoagland's solution (µg ml^{-1})**		
	Al_2O_3-NPs	**CuO-NPs**	**TiO_2-NPs**
20	0.11±0.02	0.14±0.03	0.08±0.02
200	1.2±0.14	1.6±0.08	2.1±0.10
2000	1.5±0.09	2.1±0.21	3.2±0.25