Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Electronic Supplementary Information

Nitridation of Cr-urea complex into nanocrystalline CrN and its antiferromagnetic magnetostructural transition study

Dadan Singh[a], *Saumya Tamrakar*[a], *Kamlesh Shrivas*[b]*, *Khemchand Dewangan*[*a]

[a]*Department of Chemistry, Indira Gandhi National Tribal University, Amarkantak-484887, MP, India*

[b]*School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur-492010, CG, India*

*Corresponding authors: khemchand.dewangan@igntu.ac.in (KD), kshrivas@gmail.com (KS)

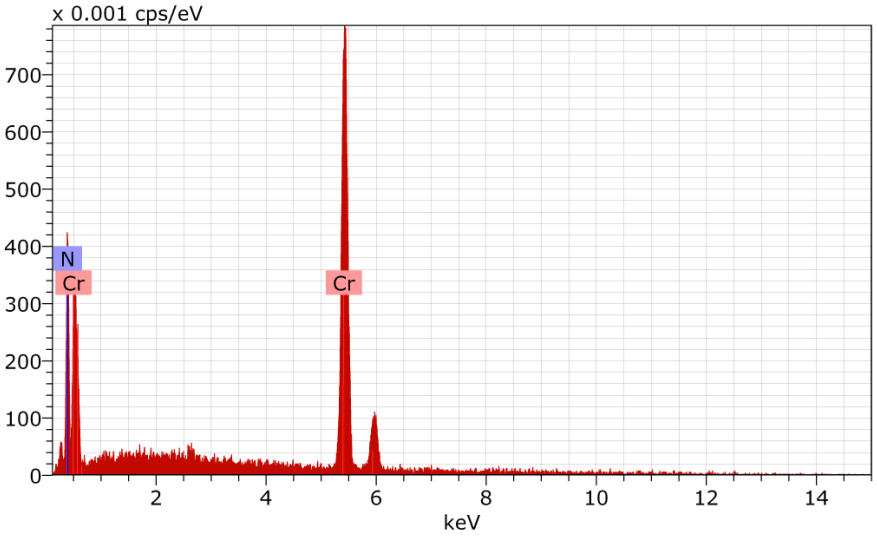

Fig. S1 EDX spectrum of CrN nanoparticles.

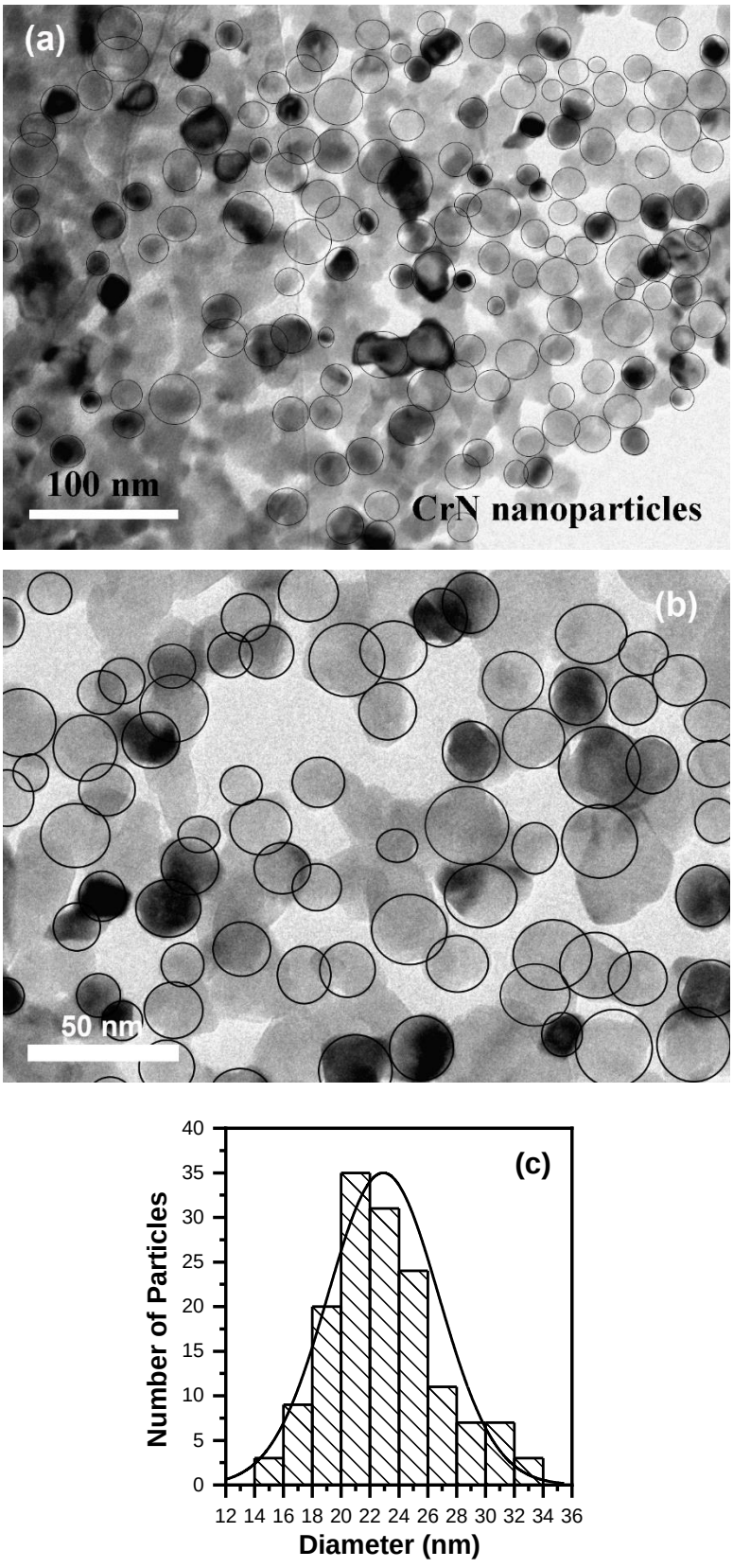

Fig. S2 (a) Low and (b) high magnified TEM images of CrN nanoparticles. (c) Histogram for the particle size distribution of CrN nanoparticles.

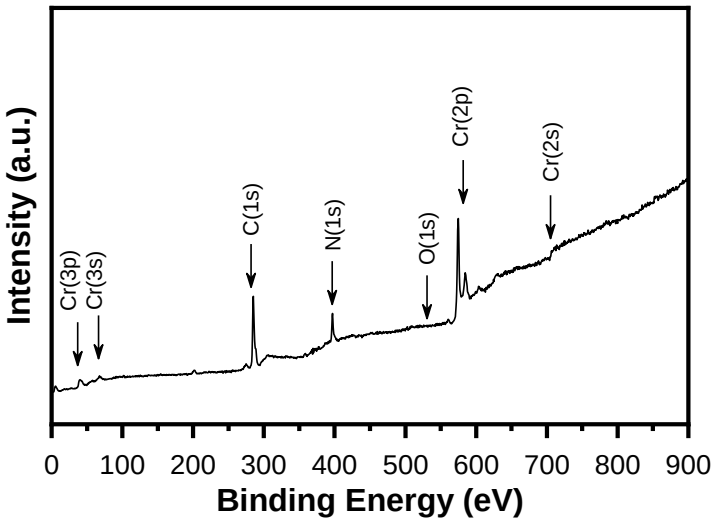

Fig. S3 XPS survey spectrum of CrN nanoparticles.

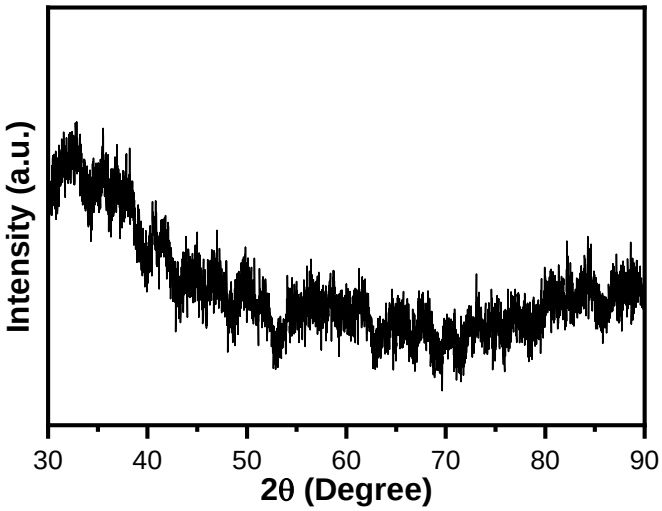

Fig. S4 XRD pattern of the product obtained after 350 °C heated Cr-Urea complex.

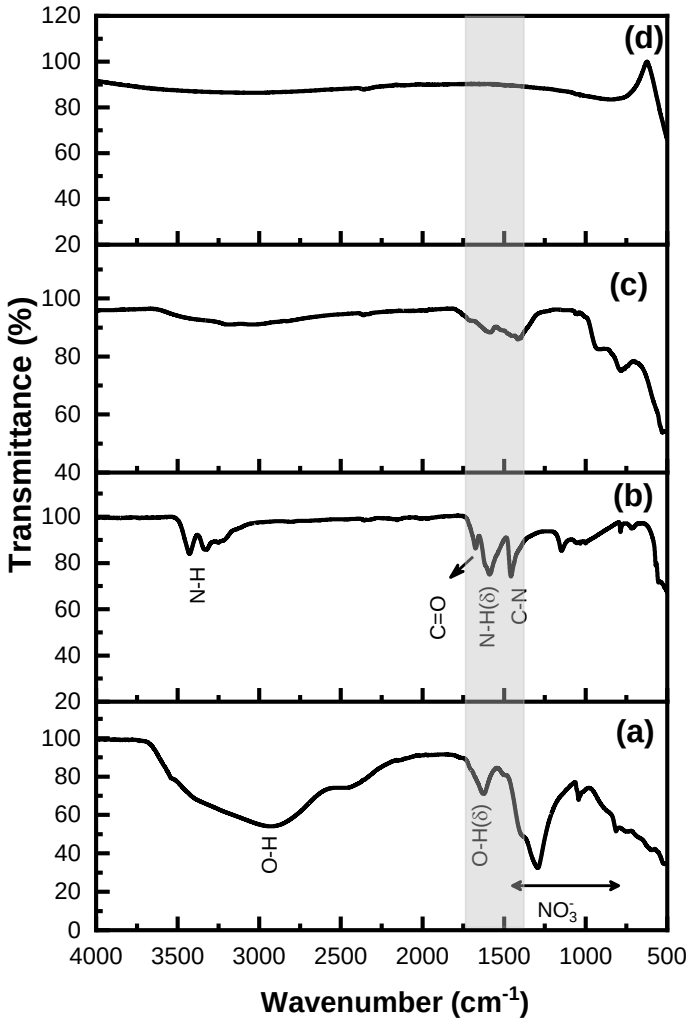

Fig. S5. FTIR spectra: (a) $Cr(NO_3)_3 \cdot 9H_2O$, (b) NH_2CONH_2 (urea), (c) precursor, and (d) CrN nanoparticles.

Table S1: IR frequencies and band assignments for the $Cr(NO_3)_3 \cdot 9H_2O$, NH_2CONH_2, precursor, and CrN nanoparticles. (ν and δ are the stretching and bending vibration modes, respectively)

Compounds	**Wavenumber (cm^{-1})**	**Band assignment**	**References**
$Cr(NO_3)_3 \cdot 9H_2O$	~ 3000	ν(O–H) of H_2O	[1]
	1627	δ(O–H) of H_2O	[1]
	1385	ν(N=O) of NO_3^-	[2-3]
	1294	ν_{asym} (NO_2) of NO_3^-	[2-3]
	1044	ν_{sym}(NO_2) of NO_3^-	[2-3]
	814	δ(NO_2) of NO_3^-	[2-3]
NH_2CONH_2	3428	ν_{asym} (NH_2)	[4]
	3328	ν_{sym} (NH_2)	[4]
	1675	ν(C=O)	[4]
	1588	δ(NH_2)	[4]
	1455	νC–N	[4]
Precursor	778 927	Cr–O–N/Cr–N	present work
CrN nanoparticles	~600	Cr–N	[5-7] and present work.

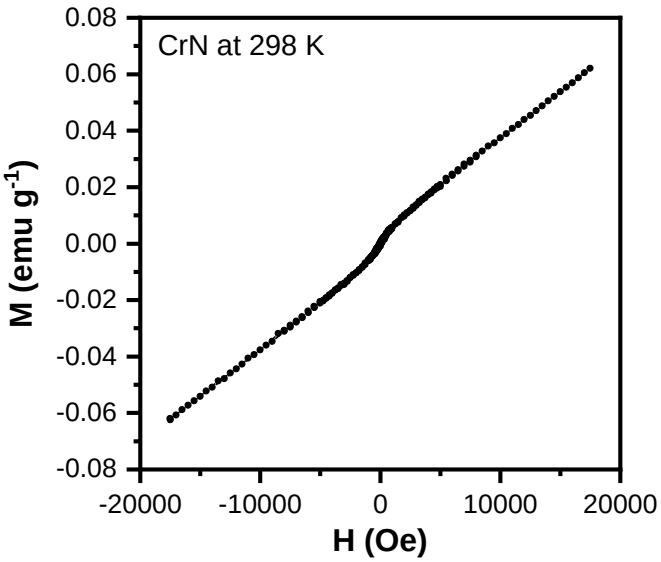

Fig. S6 Magnetization versus magnetic field (M-H) curve of CrN nanoparticles.

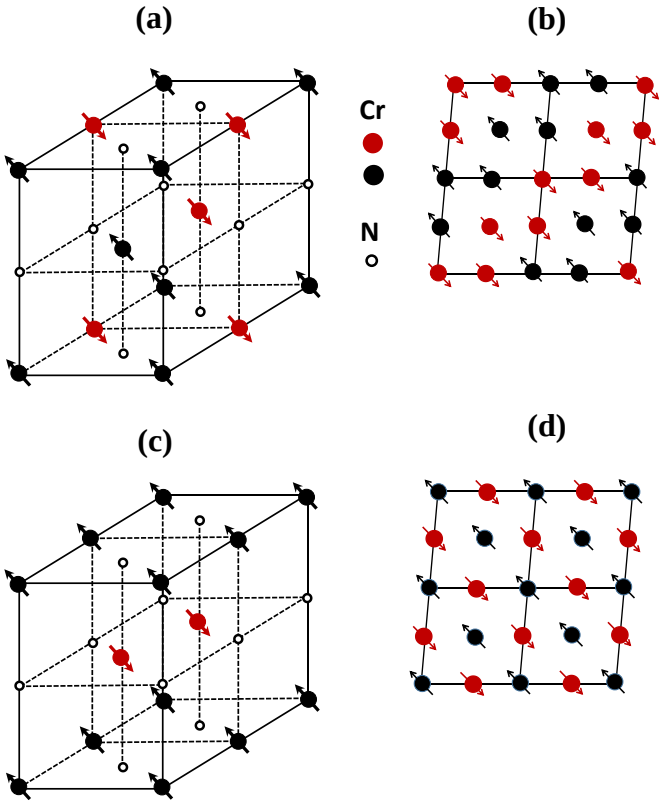

Fig. S7 Orthorhombic unit cell of CrN (four formula units): (a) and (b) AFM-$[110]_2$ ordering. (c) and (d) are the AFM-$[110]_1$ ordering.

References:

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