Supplementary data to the article:

STRUCTURAL AND MOLECULAR-WEIGHT- DEPENDENCY IN THE FORMATION OF LIGNIN NANOPARTICLES FROM FRACTIONATED SOFT- AND HARDWOOD LIGNINS

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Table S1. The nanoparticle labeling.

Lignin fraction	Initial lignin concentration, mg/ml	Nanoparticles labeling
EL1	0.1; 1; 2; 4; 6	NPs from EL1 fraction
EL2	0.1; 1; 2; 4; 6	NPs from EL2 fraction
EL3	0.1; 1; 2; 4; 6	NPs from EL3 fraction
EL4	0.1; 1; 2; 4; 6	NPs from EL4 fraction

Eucalyptus lignin fractions properties						
Abbreviation		EL1	EL2	EL3	EL4	EL5
Solvent used for the fractionation		EtOAc	EtOH	MeOH	Acetone	DMSO
Mn (g/mol) *		650	870	1220	1570	1780
Mw (g/mol) *		950	1390	2170	3150	8570
PDI		1.5	1.6	1.8	2.0	4.8
Carbohydrates (%)		2.4	3.2	3.5	2.3	11.7
Functional groups **	Aliphatic -OH (mmol/g)	0.7	1.5	1.8	1.8	2.3
	Carboxyl -OH (mmol/g)	0.3	0.4	0.3	0.2	0.2
	Total phenolic -OH (mmol/g)	5.0	4.5	3.9	3.6	2.7
	S/G ratio	2.8	2.2	2.2	1.9	1.6
	β-O-4 content per 100 of C9 lignin units	0.7	7.7	13.3	14.1	N/A

Table. S2. Eucalyptus lignin fractions properties.

* The molecular weight was determined using the SEC method (size exclusion chromatography)

** The functional groups of lignin structure were obtained by analytical pyrolysis (Py-GC/MS/FID) and ^{31}P NMR analysis.

Table. S3. Spruce lignin fractions properties.

Spruce lignin fractions properties						
Abbreviation		SL1	SL2	SL3	SL4	SL5
Solvent used for the fractionation		EtOAc	EtOH	MeOH	Acetone	DMSO
Mn (g/mol) *		740	1190	1530	2970	3210
Mw (g/mol) *		1200	2280	3080	6360	20920
PDI		1.6	1.9	2.0	2.1	6.2
Carbohydrates (%)		4.8	4.3	4.9	3.9	15.4
Functional groups **	Aliphatic -OH (mmol/g)	0.9	1.9	2.0	2.0	2.7
	Carboxyl -OH (mmol/g)	0.7	0.5	0.3	0.3	0.2
	Total phenolic -OH (mmol/g)	5.0	4.6	4.2	4.1	3.1
	S/G ratio	N/A	N/A	N/A	N/A	N/A
	β-O-4 content per 100 of C9 lignin units	2	8.4	10.4	9.4	N/A

* The molecular weight was determined using SEC method (size exclusion chromatography)

** The functional groups of lignin structure were obtained by analytical pyrolysis (Py-GC/MS/FID) and ^{31}P NMR analysis.

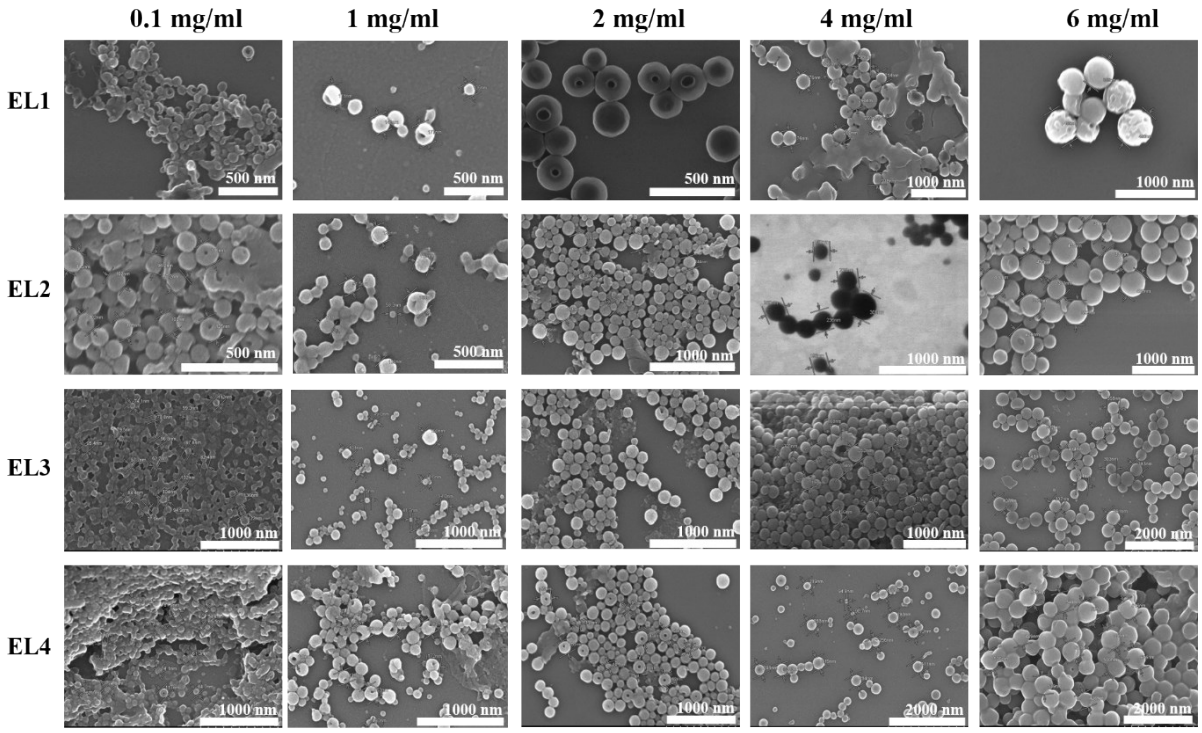

Fig. S1. SEM micrographs of eucalyptus LNPs derived from corresponding lignin fractions.

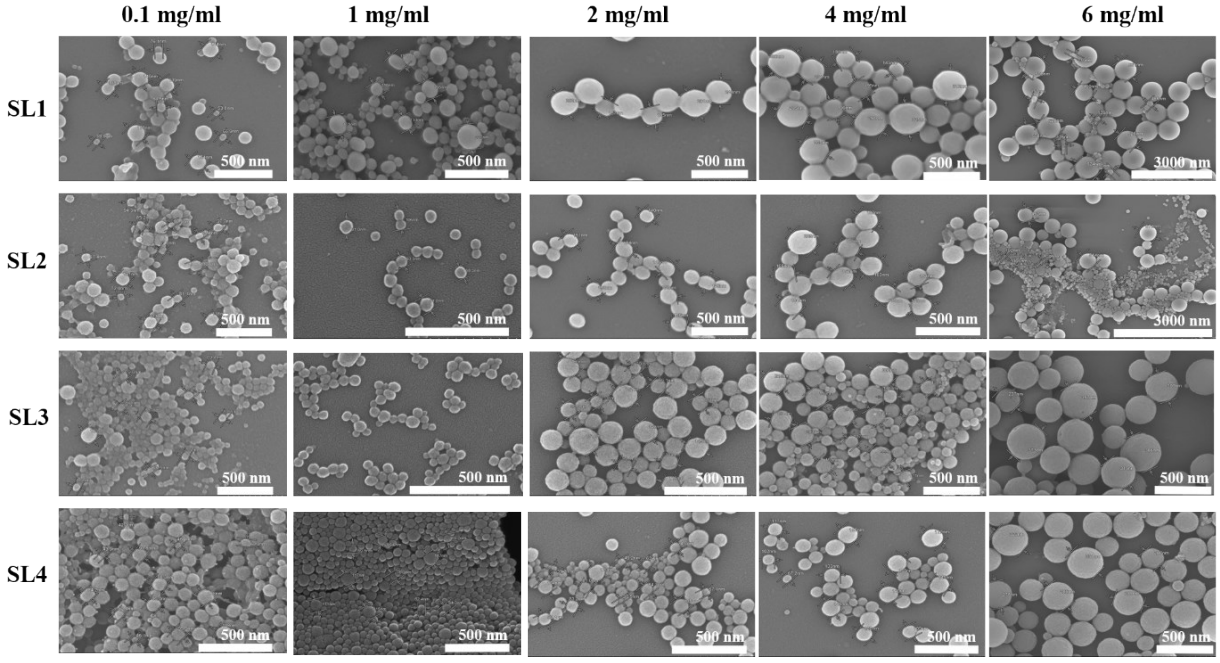

Fig. S2. SEM micrographs of spruce LNPs derived from corresponding lignin fractions.

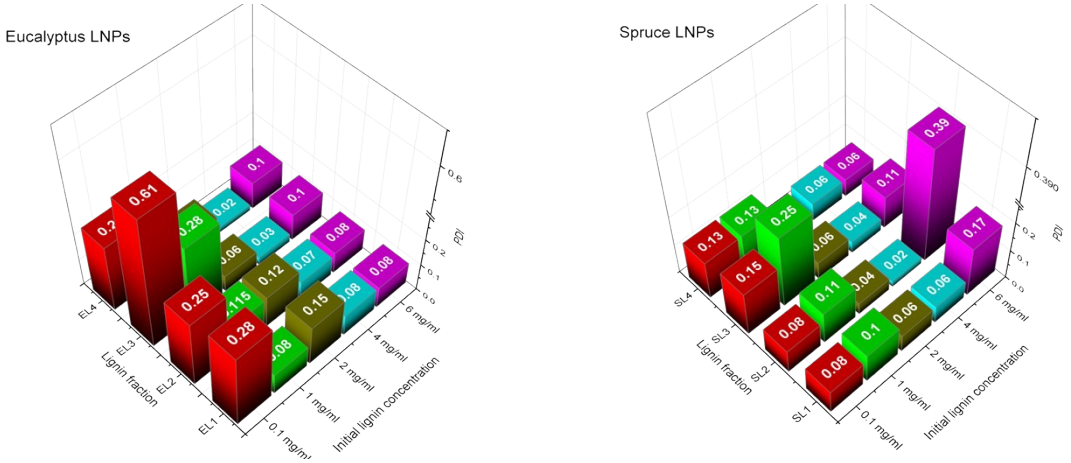

Fig. S3. Polydispersity indices of LNPs.

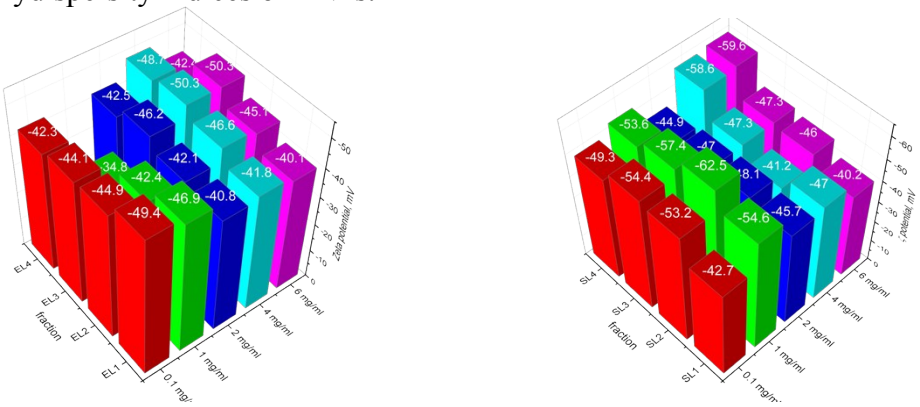

Fig. S4. Zeta-potential for eucalyptus (a) and spruce (b) LNPs.

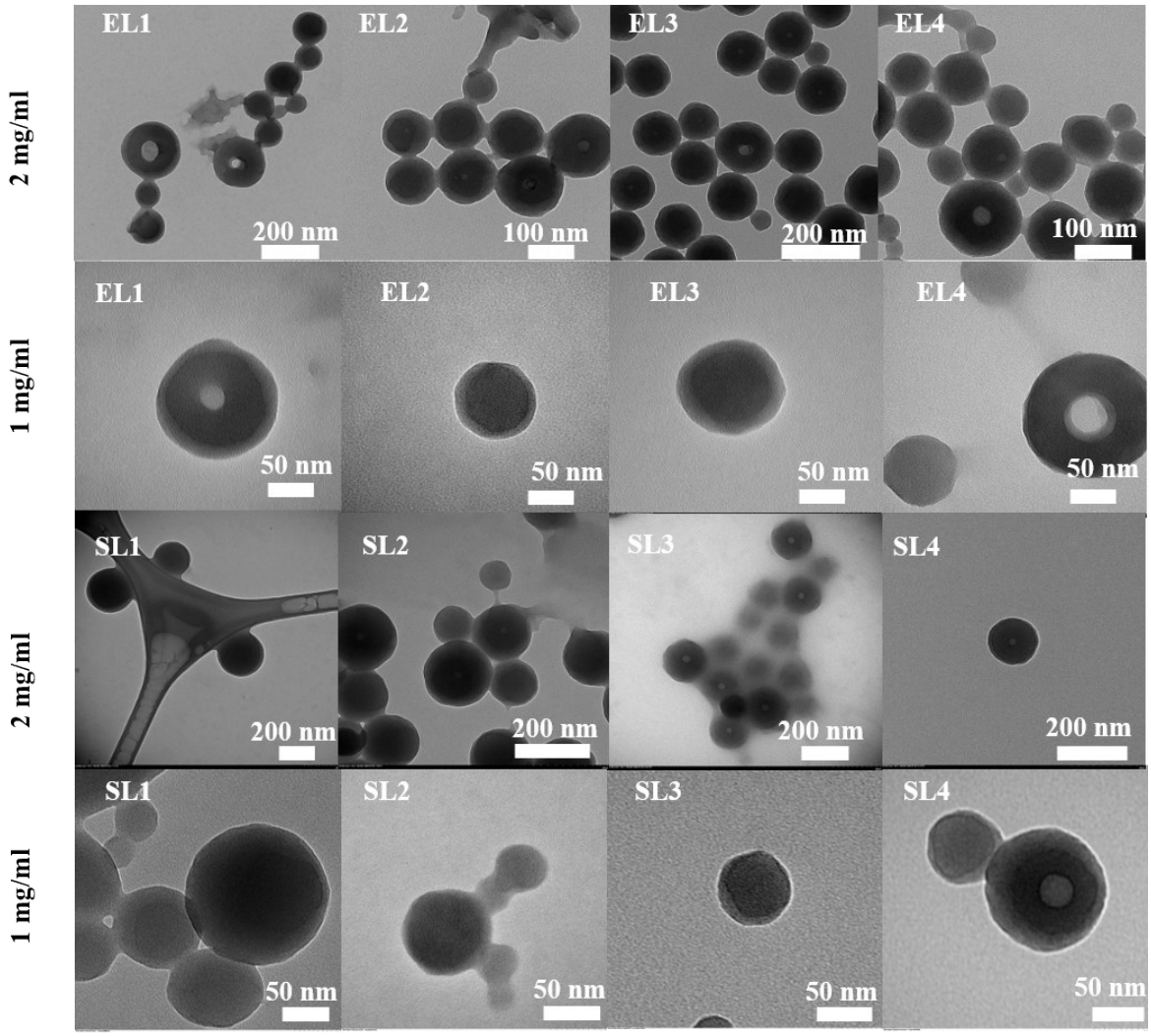

Fig. S5. TEM micrographs of LNPs.

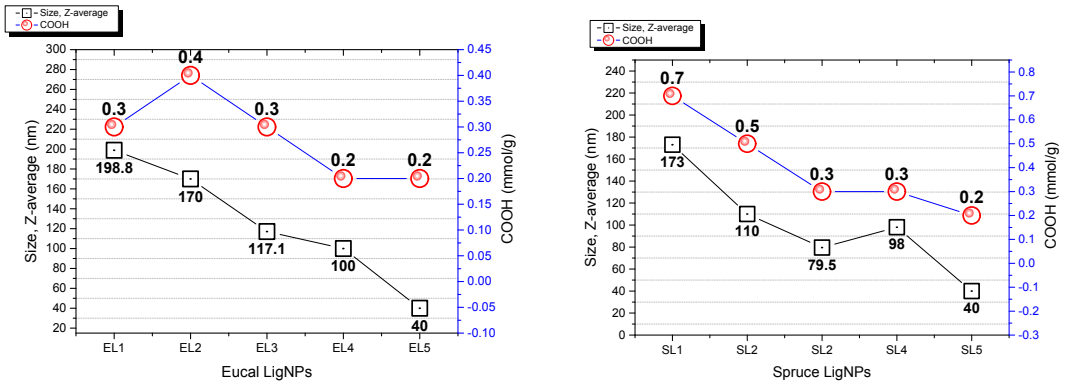

Fig. S6. Carboxylic groups content in corresponding lignin fractions vs LNPs size.

Table S4. The number of S and G units for each lignin fraction.

Fraction	S-units, %	G-units, %	Fraction	G-units, %
EL1	69.1	24.9	SL1	84.6
EL2	63.9	28.7	SL2	84.6
EL3	64.1	28.7	SL3	82.2
EL4	60.6	31.7	SL4	82.7
EL5	57.1	35.7	SL5	85.3

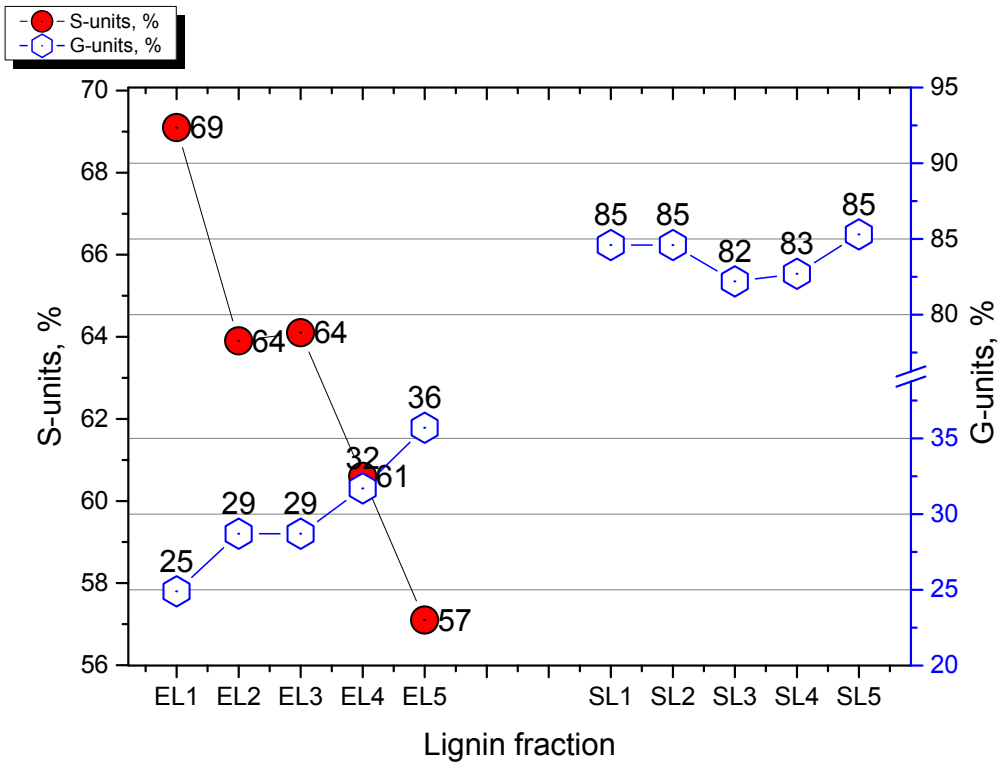

Fig. 7. Number of S and G units for each lignin fraction.