Fig. S1 (a) The FE-SEM images of the N-doped graphene (NG-300) and corresponding EDS maps, (b) C, (c) N, and (d) O.
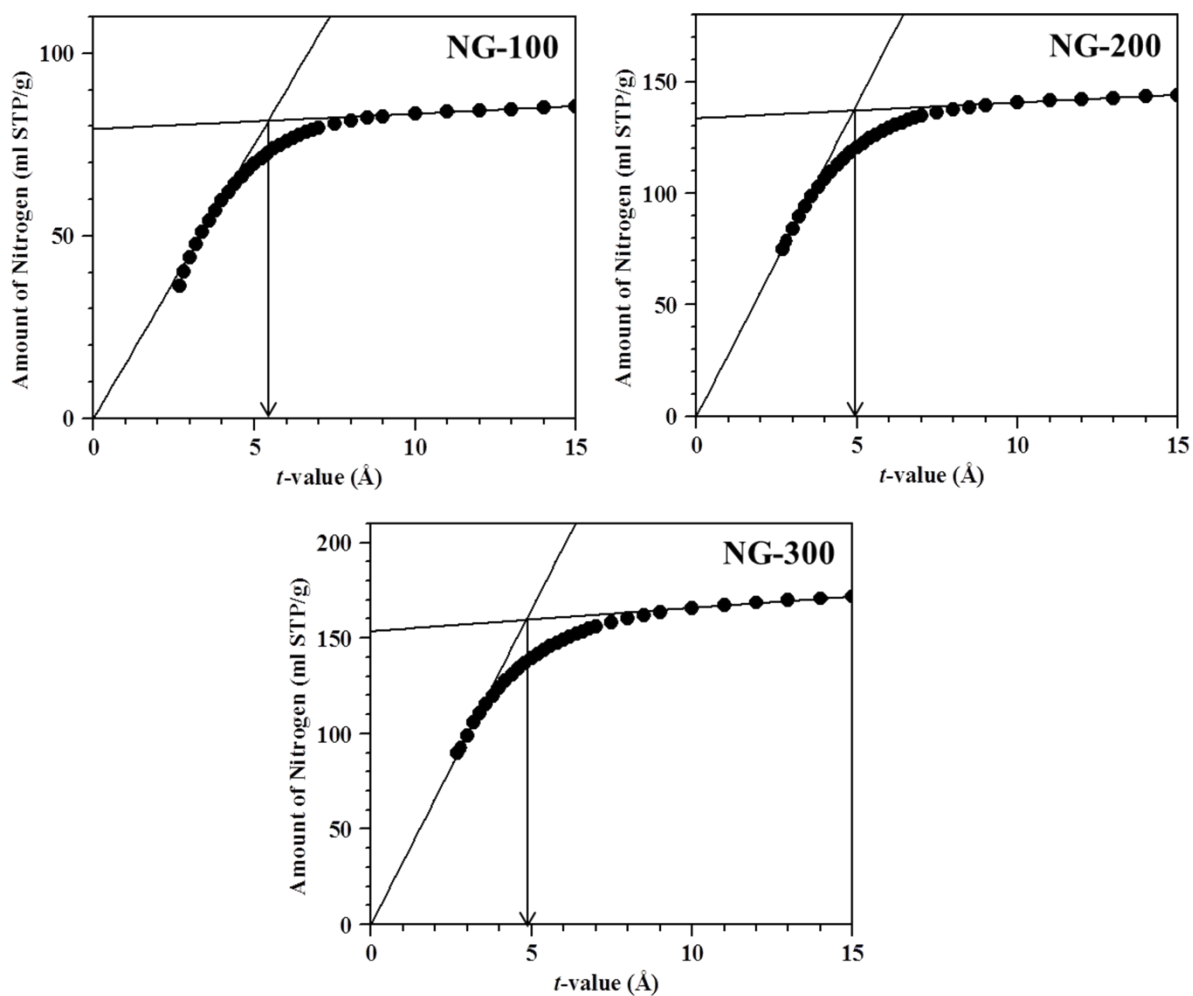
Fig. S2 *t*-plots calculated from N_2 adsorption-desorption isotherms for NGs.

Table S1 CHNS elemental analysis data of the obtained NGs.

Sample[a]	C (wt%)	H (wt%)	N (wt%)	O (wt%)[b]	C/O ratio[c]
GO	47.66	1.96	-	50.38	1.26
NG-100	75.11	1.75	3.54	19.60	5.12
NG-200	77.30	1.74	3.39	17.57	5.87
NG-300	76.72	1.96	3.2	18.12	5.65

[a]All samples were dried in a vacuum oven at 80 ºC for 24 h before elemental measurements.

[b]The values of O were calculated by subtracting the sum of C and H from 100%.

[c]The C/O ratio were calculated according to following equation: C/O = 16C%(wt)/12O%(wt).

Table S2 The N configuration portions of NGs in total nitrogen atom.

Sample	N-6^a (%)^b	N-5^a (%)^b	N-G^a (%)^b	N-X^a (%)^b
NG-100	29.4	63.1	7.5	-
NG-200	26.2	62.0	8.3	3.5
NG-300	30.0	64.4	5.6	-

^{a}N-6, N-5, N-G, and N-X denote pyridinic-N, pyrrolic-N, graphitic-N and pyridinic-N-oxide, respectively.

^{b}The values of the N configuration portions were calculated by the deconvoluted area of the N 1s XPS spectra (N-6 + N-5 + N-G + N-X = 100%).

Table S3 Electro conductivity of GO, and NGs.

Sample	Electro conductivity (S/m)
GO	$<2 \times 10^{-7}$
NG-100	2.8×10
NG-200	1.4×10^2
NG-300	8.3×10

The thickness and the sheet resistance of prepared tablets of NGs use to calculate the electrical conductivity of the NGs by following equation:

$$\sigma = 1 / (R \times t)$$

where σ is electrical conductivity in S/m, R is sheet resistance in ohm/sq, t is thickness in m. All prepared tablet of NGs has the thickness of 0.6 mm.