

## Supporting Information

20

5

25

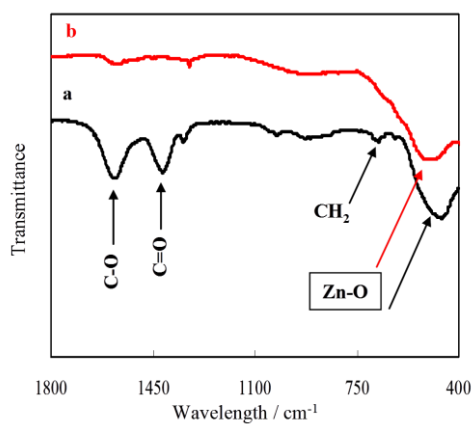
10

30

15

35

40



45

**Fig. S1.** FT-IR spectra of (a) the precipitation ZnO QDs by heptanes for the first time and (b) the ZnO QDs taken from the flexible substrate PEN which washed several times.

50

55

60

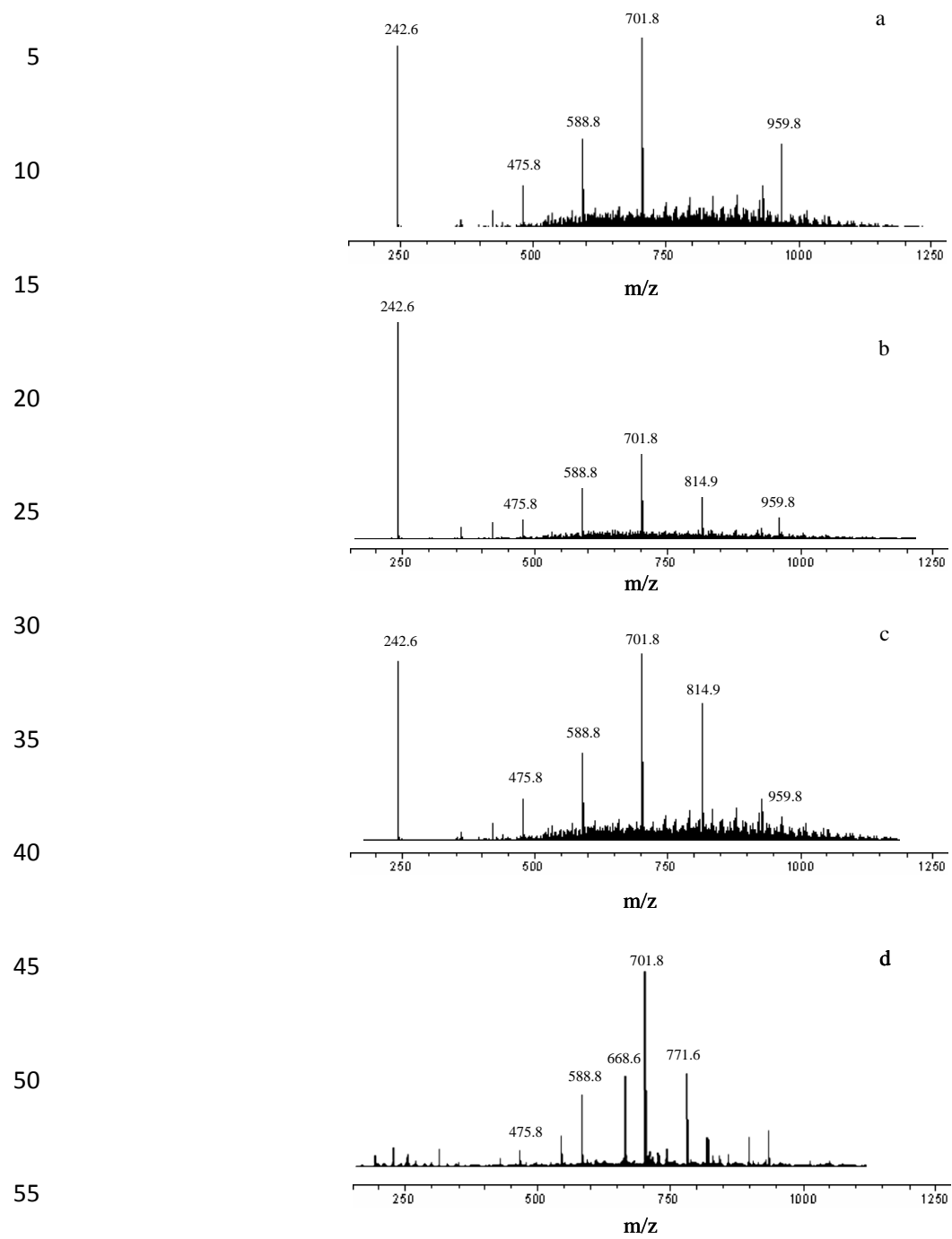
65

70

75

80

85



**Fig. S2.** HRMS spectra of (a) N719, (b) 0.3 Na-N719, (c) 0.6 Na-N719 and (d) 0.9 Na-N719.

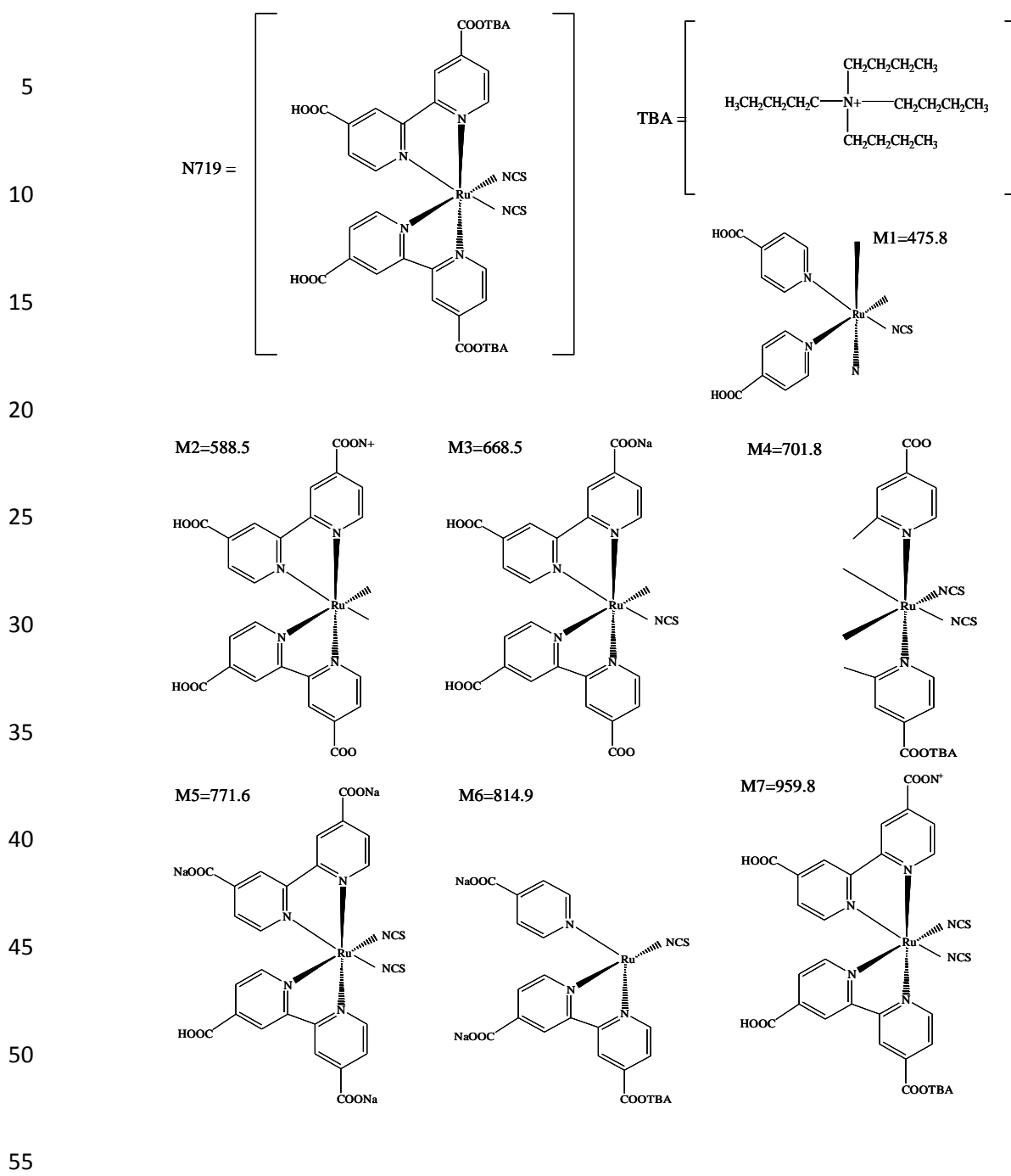


Fig. S3. The molecular structure of N719 dye and its fragments structures of TBA, M1, M2, M3, M4, M5, M6 and M7.

65

70

5

10

15

20

25

30

35

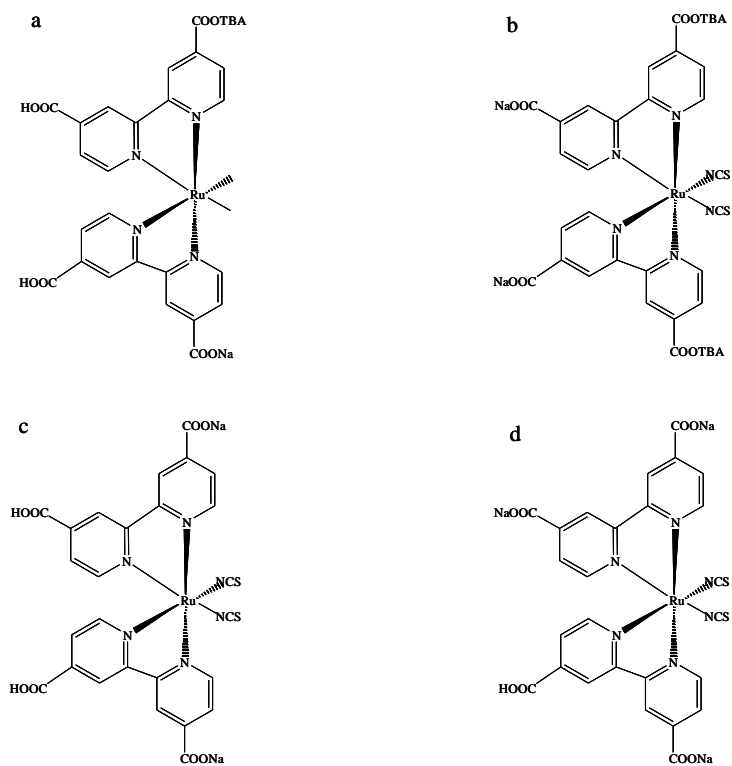
40

45

50

55

60



**Fig. S4.** The structures of the modified dyes: (a-b) 0.3- or 0.6 Na-N719 and (c-d) 0.9 Na-N719.