

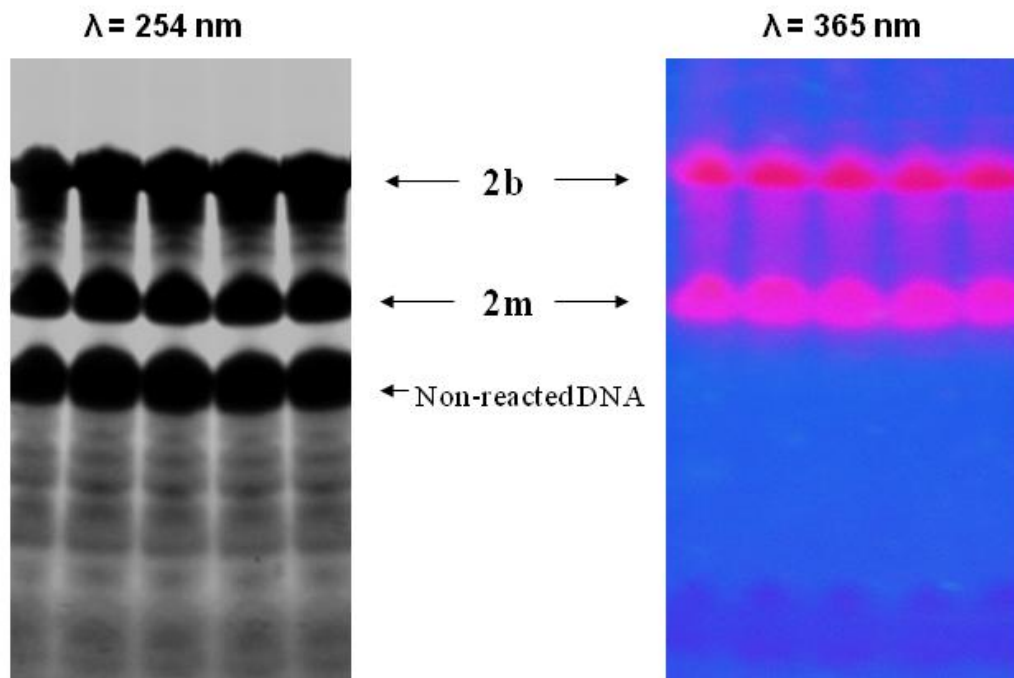
## Supplementary information

# Programmable multimetallic linear nanoassemblies of Ruthenium-DNA conjugates

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### Gel electrophoresis purification:

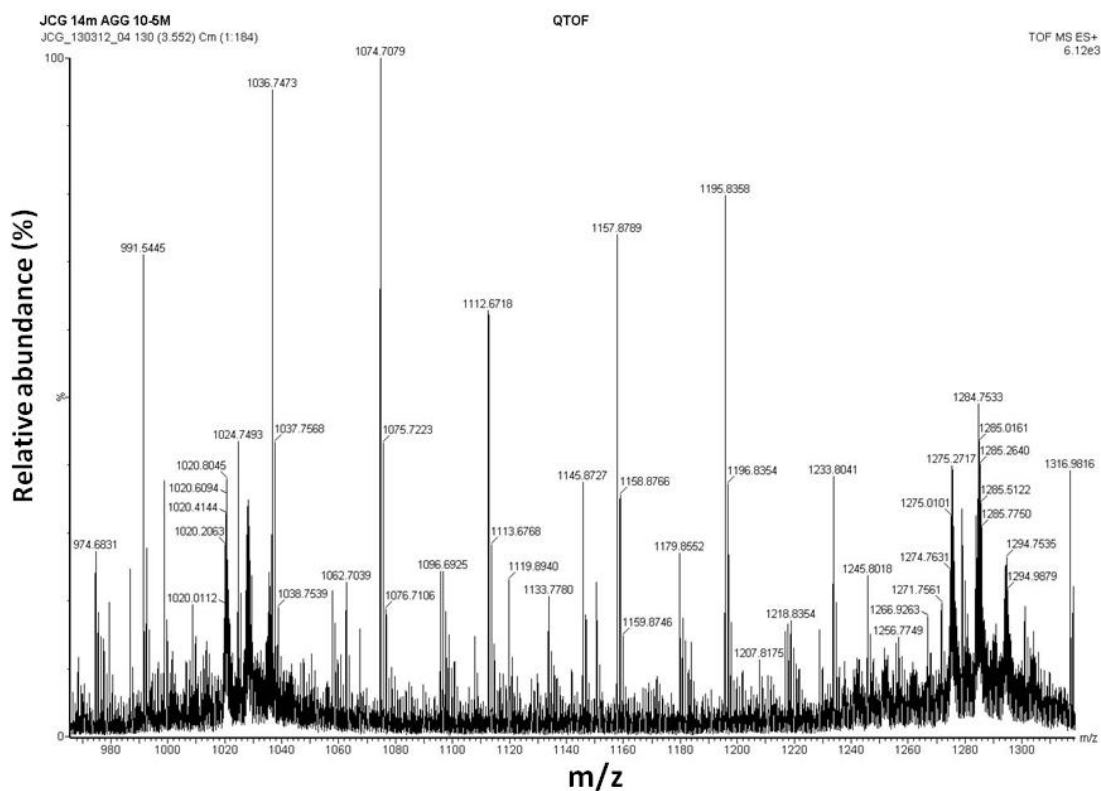
One example of gel purification of a synthesis carried on solid support. Visualization of the crude of reaction of the synthesis of **2m** and **2b** on 20 % denaturing polyacrylamide gel with three major bands corresponding of **2b**, **2m** and non-reacted DNA under UV light ( $\lambda = 254\text{nm}$  (left) and  $\lambda = 365\text{nm}$  (right)).



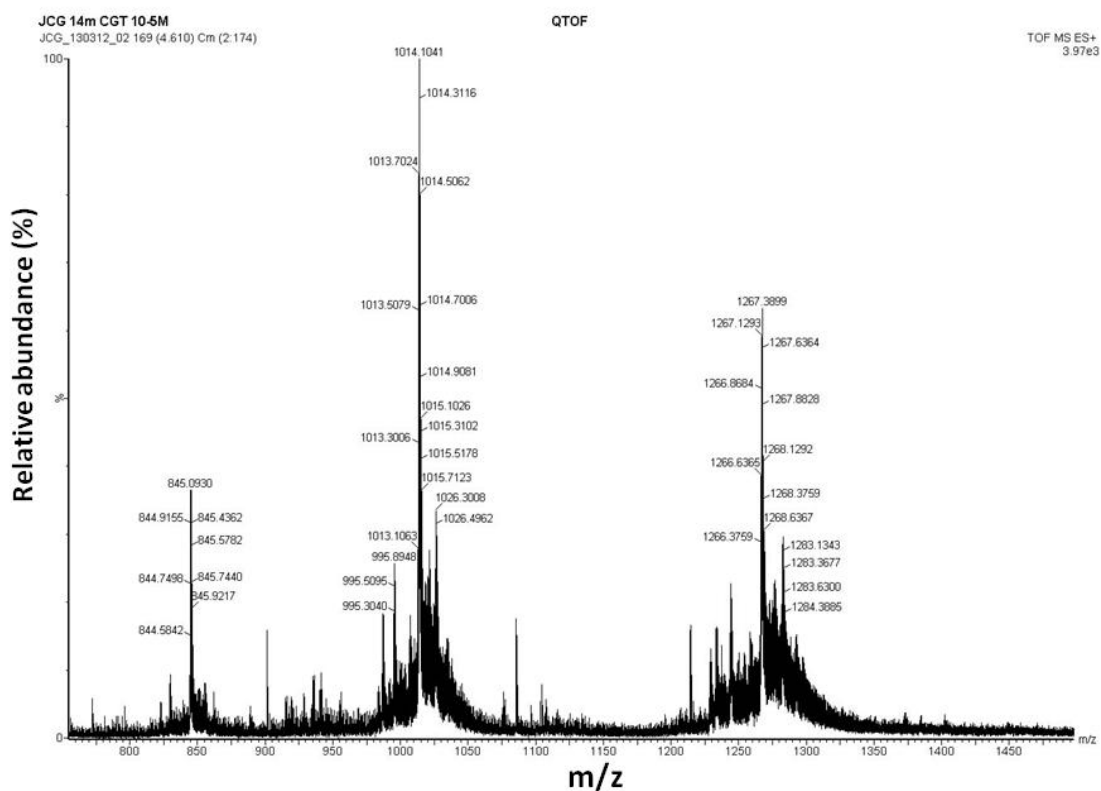


## High resolution electrospray mass values and spectra of DNA-Ruthenium complex conjugates.

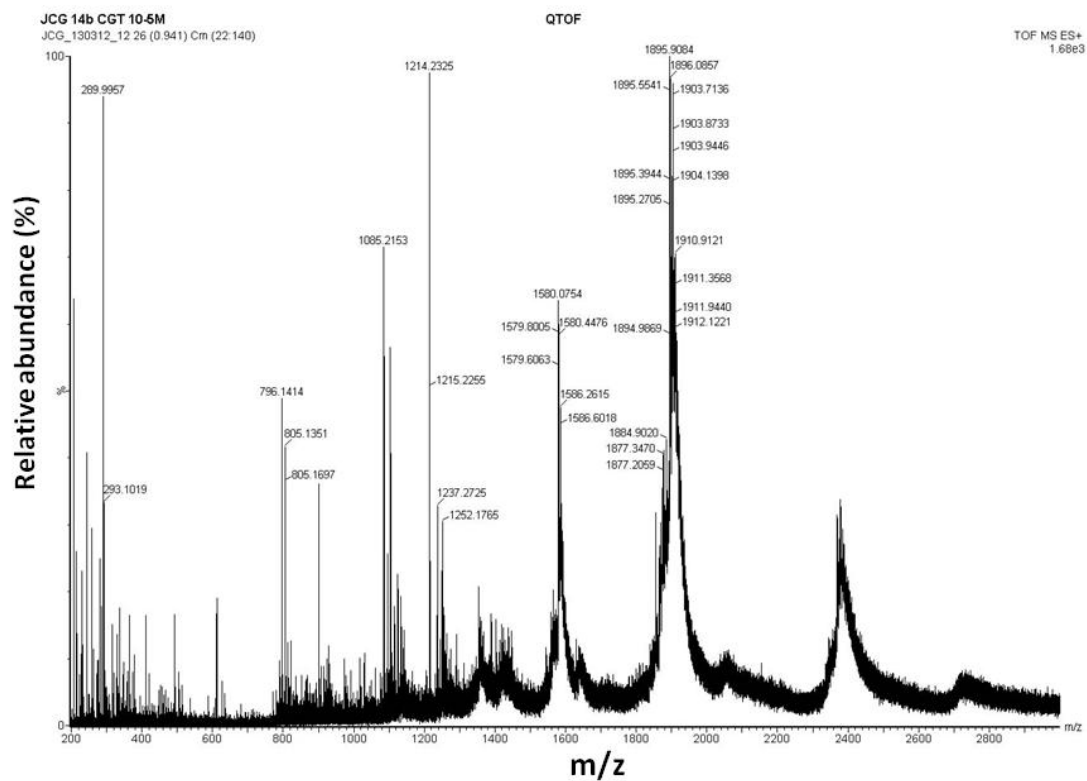
Sample	Molecular Formula	Theoretical mass		Experimental mass		Difference ppm
		H <sup>+</sup> Charge		H <sup>+</sup> Charge		
1m	C <sub>175</sub> H <sub>210</sub> N <sub>59</sub> O <sub>89</sub> P <sub>14</sub> Ru	4	1273,7359	4	1273,752	12,6
		5	1019,1903	5	1019,1924	2,1
2m	C <sub>174</sub> H <sub>209</sub> N <sub>60</sub> O <sub>87</sub> P <sub>14</sub> Ru	4	1265,9873	4	1265,9893	1,6
		5	1012,9914	5	1012,9915	0,1
		6	844,3274	6	844,3308	4,0
2b	C <sub>316</sub> H <sub>394</sub> N <sub>114</sub> O <sub>170</sub> P <sub>28</sub> Ru	5	1894,5562	5	1894,6682	59,1
		6	1578,9648	6	1578,9386	16,6
		7	1353,5424	7	1353,625	61,0
3m	C <sub>233</sub> H <sub>281</sub> N <sub>88</sub> O <sub>122</sub> P <sub>20</sub> Ru	3	2327,0851	3	2327,0852	0,0
		4	1745,5658	4	1745,5606	3,0
		5	1396,6542	5	1396,6616	5,3
4m	C <sub>231</sub> H <sub>283</sub> N <sub>78</sub> O <sub>126</sub> P <sub>20</sub> Ru	4	1721,0569	4	1721,043	8,1
		5	1377,0471	5	1377,079	23,2
		6	1147,7072	6	1147,7289	18,9
4b	C <sub>430</sub> H <sub>542</sub> N <sub>150</sub> O <sub>248</sub> P <sub>40</sub> Ru	5	2622,6677	5	2622,8994	88,3
		6	2185,7244	6	2185,9023	81,4
		7	1873,622	7	1873,9703	185,9
5m	C <sub>271</sub> H <sub>330</sub> N <sub>101</sub> O <sub>147</sub> P <sub>24</sub> Ru	5	1638,8924	5	1638,973	49,2
		6	1365,9117	6	1365,98	50,0
		7	1170,9254	7	1170,936	9,1



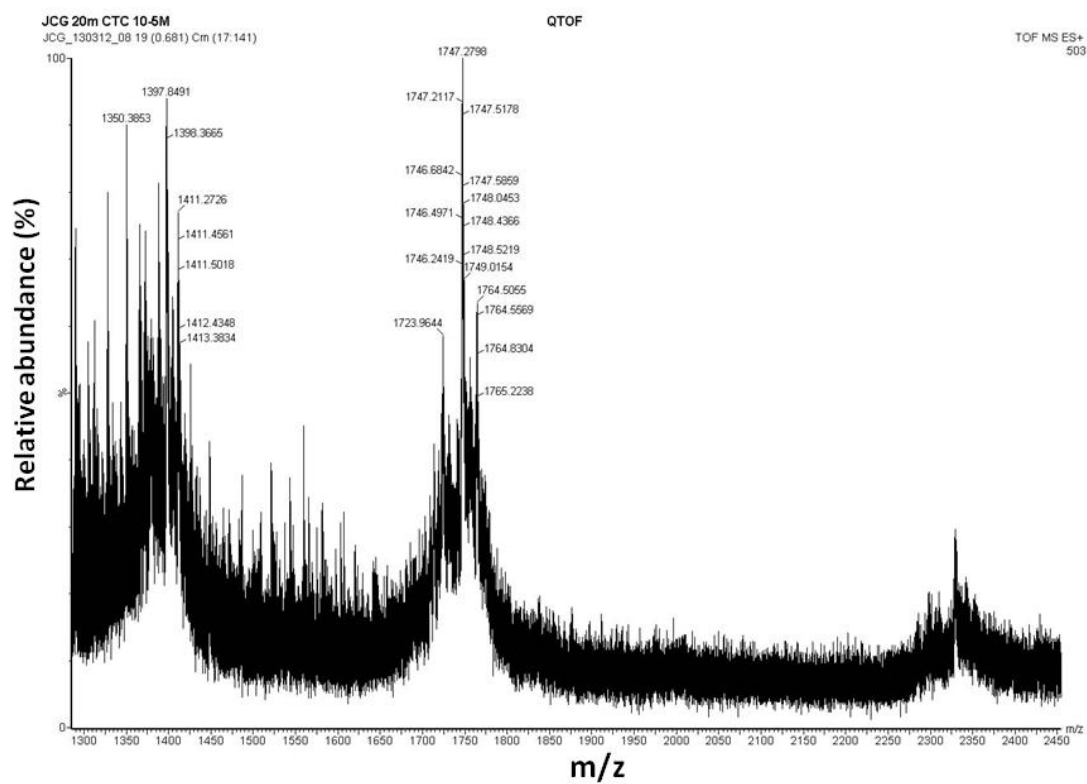
High resolution electrospray mass spectrum of **1m**.



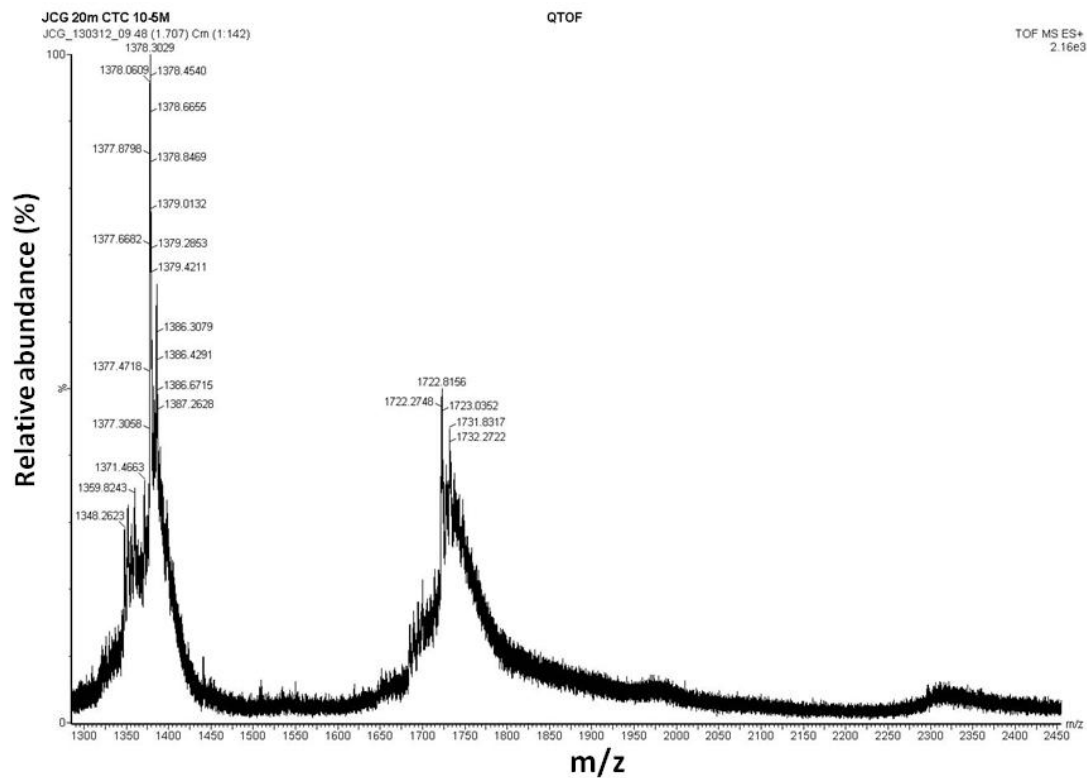
High resolution electrospray mass spectrum of **2m**.



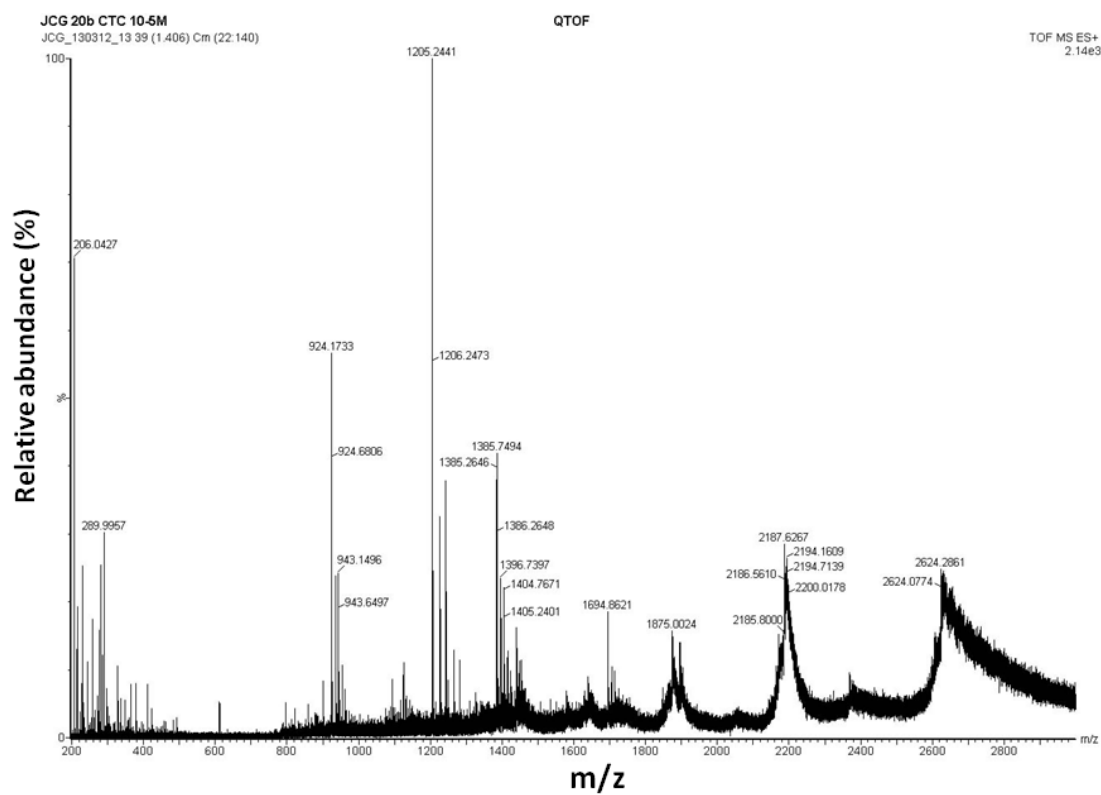
High resolution electrospray mass spectrum of **2b**.



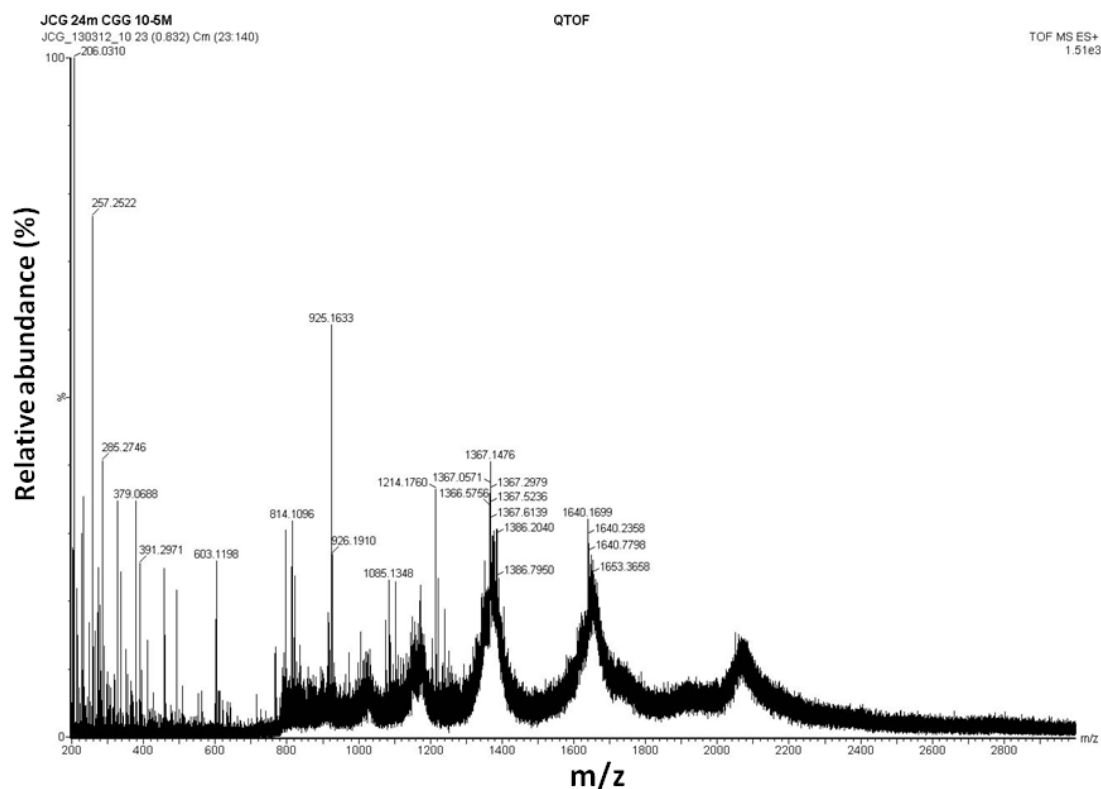
High resolution electrospray mass spectrum of **3m**.



High resolution electrospray mass spectrum of **4m**.



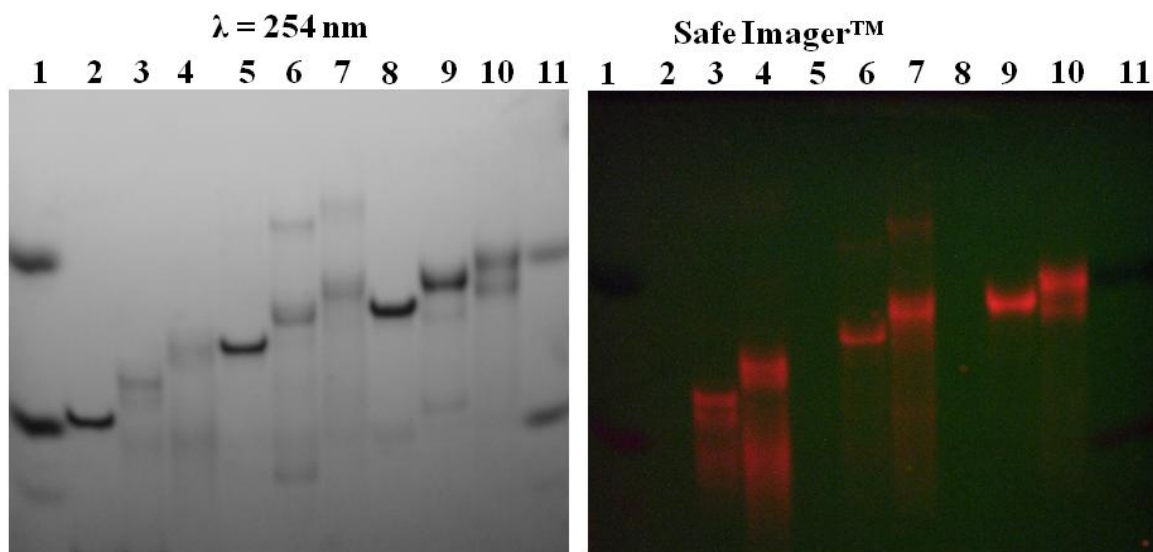
High resolution electrospray mass spectrum of **4b**.



High resolution electrospray mass spectrum of **5m**.

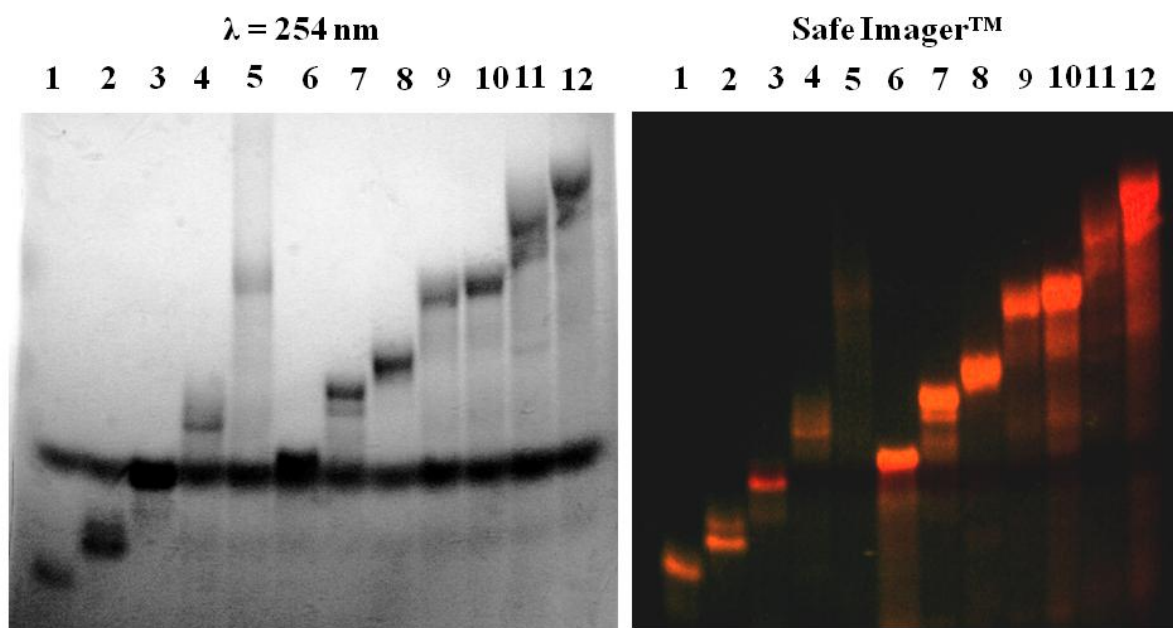
## PAGE of Multimetallic linear nanoassemblies of Ruthenium-DNA conjugates

Polyacrylamide gel electrophoresis of the first duplexes composed of no, one or two ruthenium complexes in native condition (20 % polyacrylamide) and visualized under UV light ( $\lambda = 254\text{nm}$ ) (left) and on safe imager<sup>TM</sup> 2.0 blue light transilluminator (right).



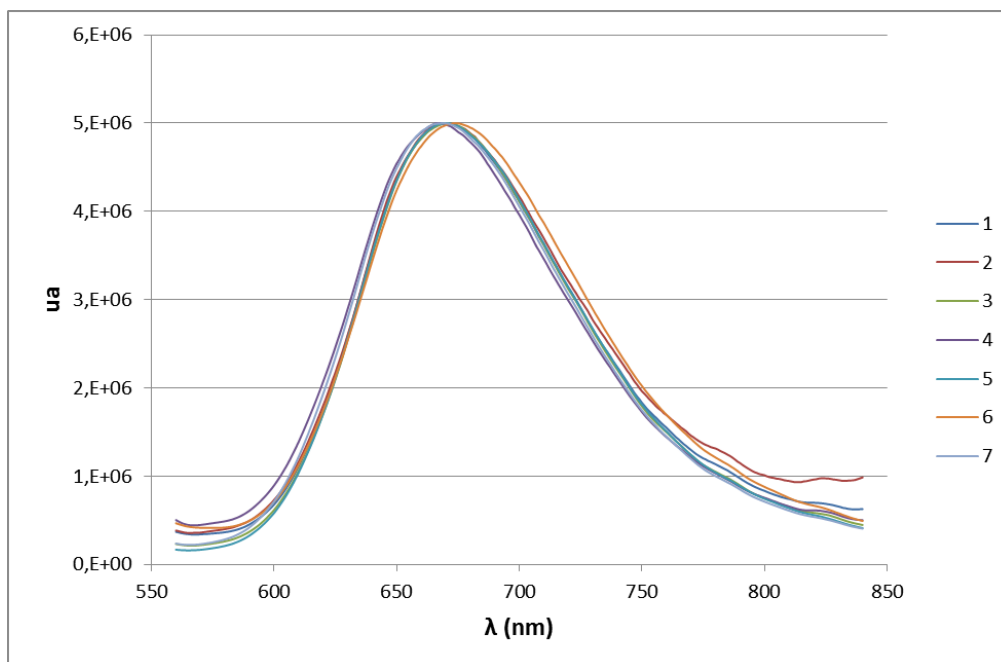
Lanes 1 and 11: two products for migration control, upper: xylene cyanol, lower: bromophenol blue; lane 2: **1 + 2**; lane 3: **1m + 2**; lane 4: **1m + 2m**; lane 5: **3 + 4**; lane 6: **3m + 4**; lane 7: **3m + 4m**; lane 8: **5 + 6**; lane 9: **5m + 6**; lane 10: **5m + 6m**.

Polyacrylamide gel electrophoresis of the longer linear assemblies composed of three to seven ruthenium complexes in native conditions (12 % polyacrylamide) and visualized under UV light ( $\lambda = 254\text{nm}$ ) (left) and on safe imager<sup>TM</sup> 2.0 blue light transilluminator (right).



Lane 1: **2b**; lane 2: **4b**; lane 3: **6b**; lane 4: **7b**; lane 5: **8b**; lane 6: **2b** + 2x**1m**; lane 7: **4b** + 2x**3m**; lane 8: **6b** + 2x**5m**; lane 9: **7b** + 2x**1** + 2x**3m**; lane 10: **7b** + 2x**1m** + 2x**3m**; lane 11: **8b** + 2x**1** + 2x**3** + 2x**5m**; lane 12: **8b** + 2x**1m** + 2x**3m** + 2x**5m**.

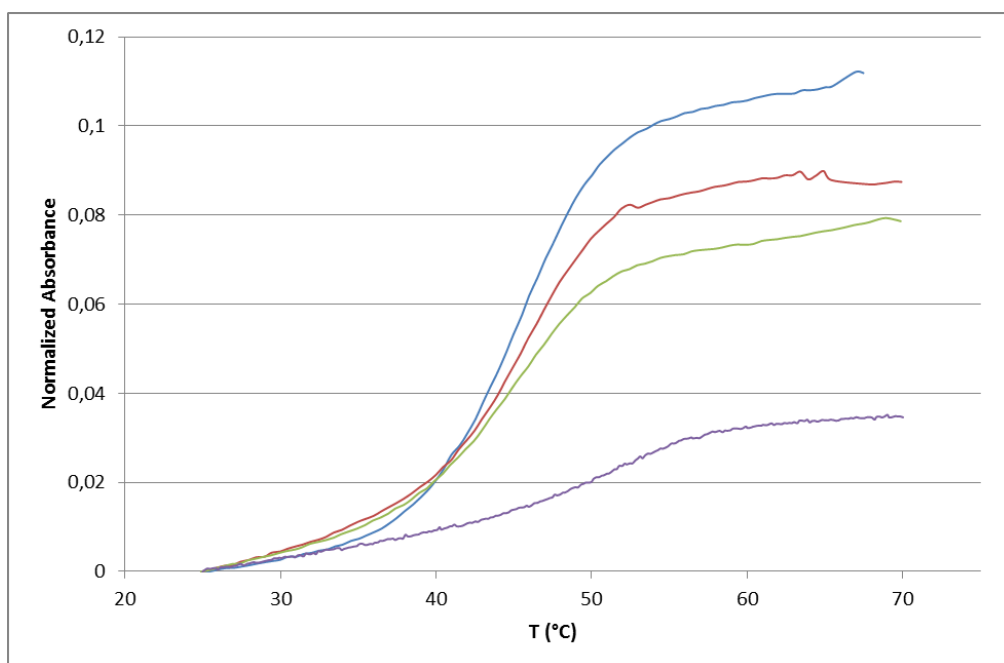
### Fluorescence spectra of linear assemblies.



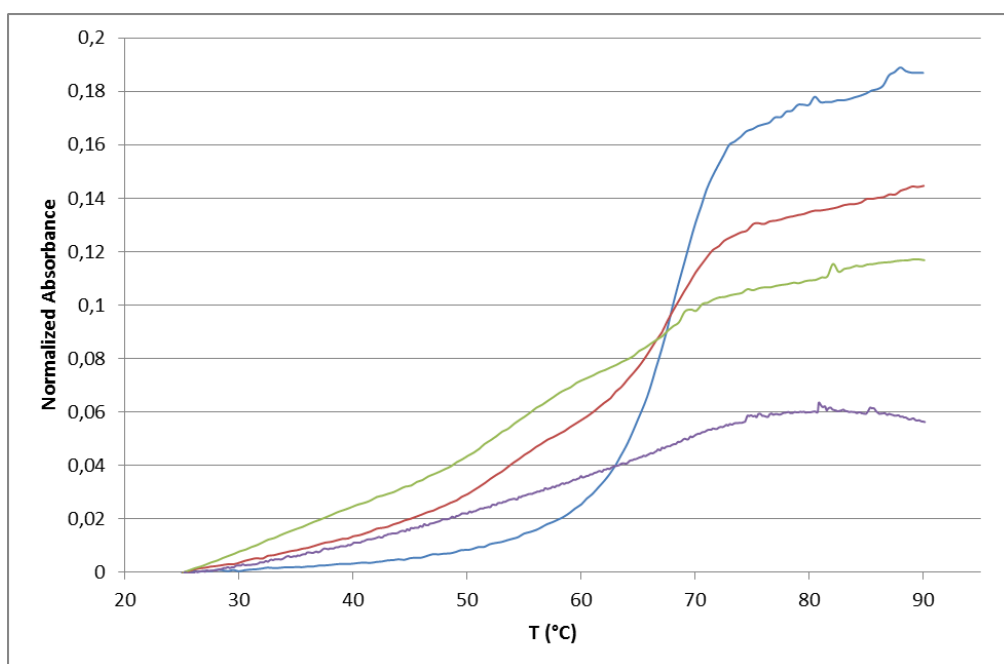
curve 1: **2b** + 2x**1m**; curve 2: **4b** + 2x**3m**; curve 3: **6b** + 2x**5m**; curve 4: **7b**+2x**1** + 2x**3m**;  
curve 5: **7b** + 2x**1m** + 2x**3m**; curve 6: **8b** + 2x**1** + 2x**3** + 2x**5m**; curve 7: **8b** + 2x**1m** + 2x**3m** + 2x**5m**



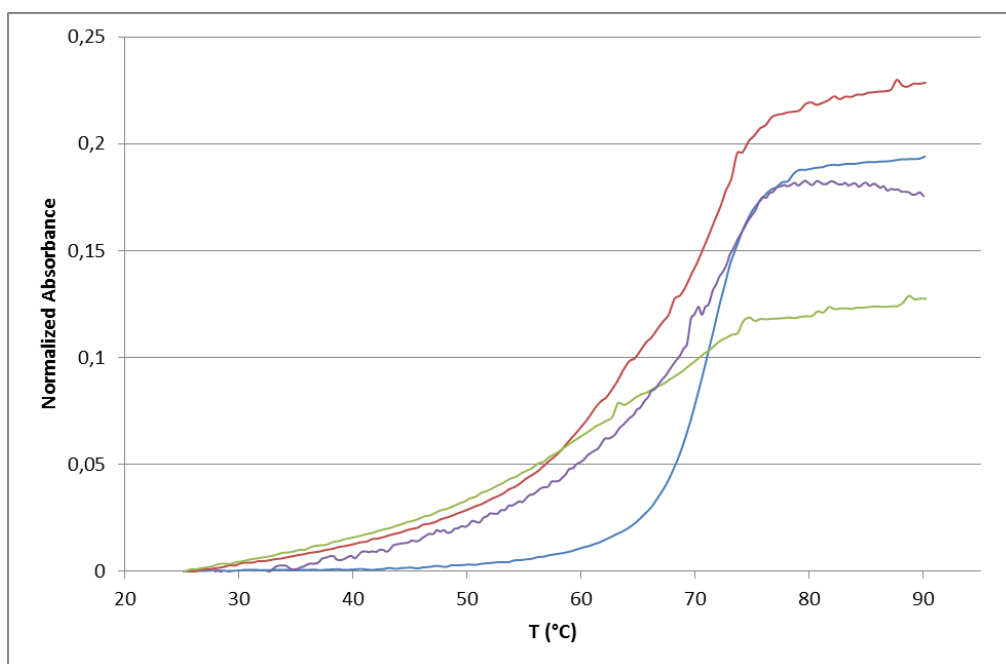
## T<sub>m</sub> curves of linear assemblies



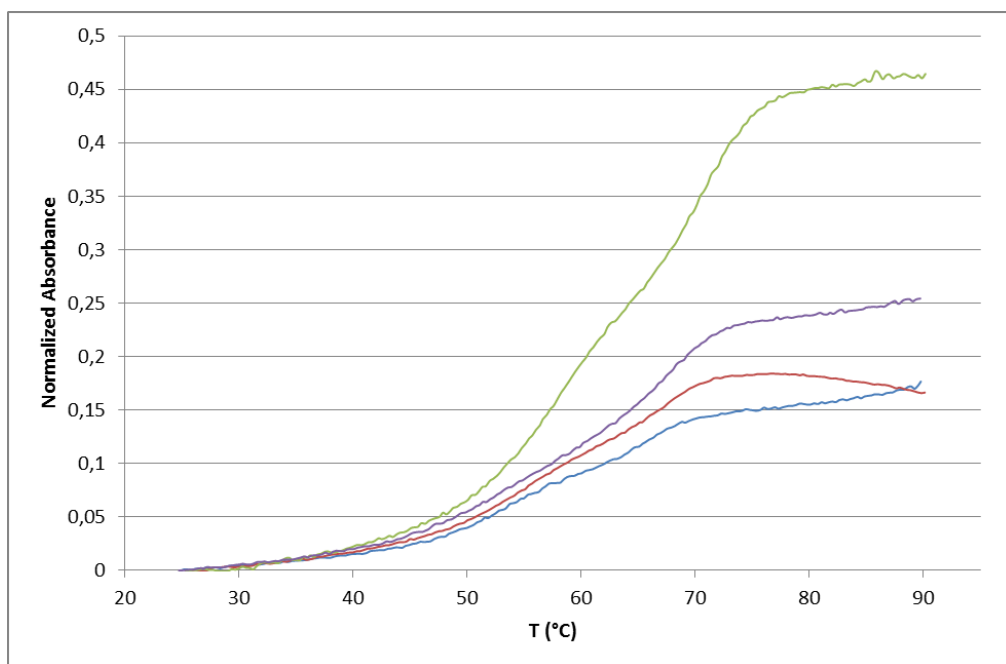
T<sub>m</sub> curves - Blue: **1+2**; Red: **1m+2**; Green: **1m+2m**; Purple: **2b+2x1m**



T<sub>m</sub> curves - Blue: **3+4**; Red: **3m+4**; Green: **3m+4m**; Purple: **4b+2x3m**

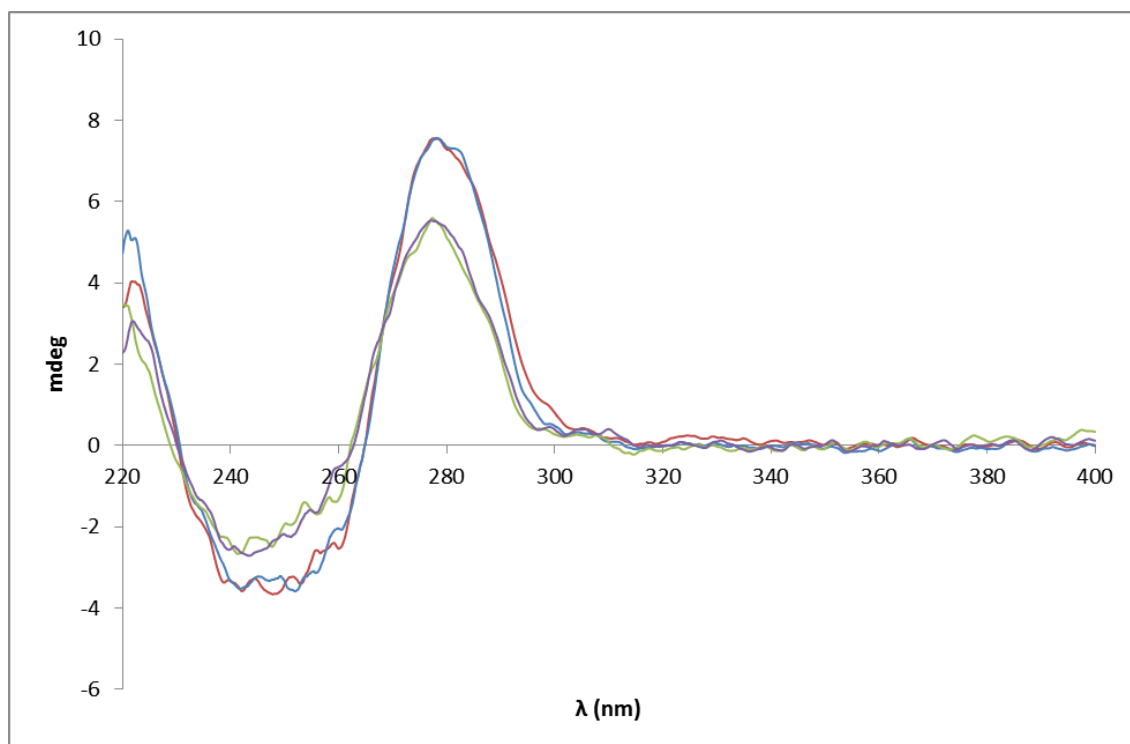


T<sub>m</sub> curves - Blue: **5+6**; Red: **5m+6**; Green: **5m+6m**; Purple: **6b+2x5m**

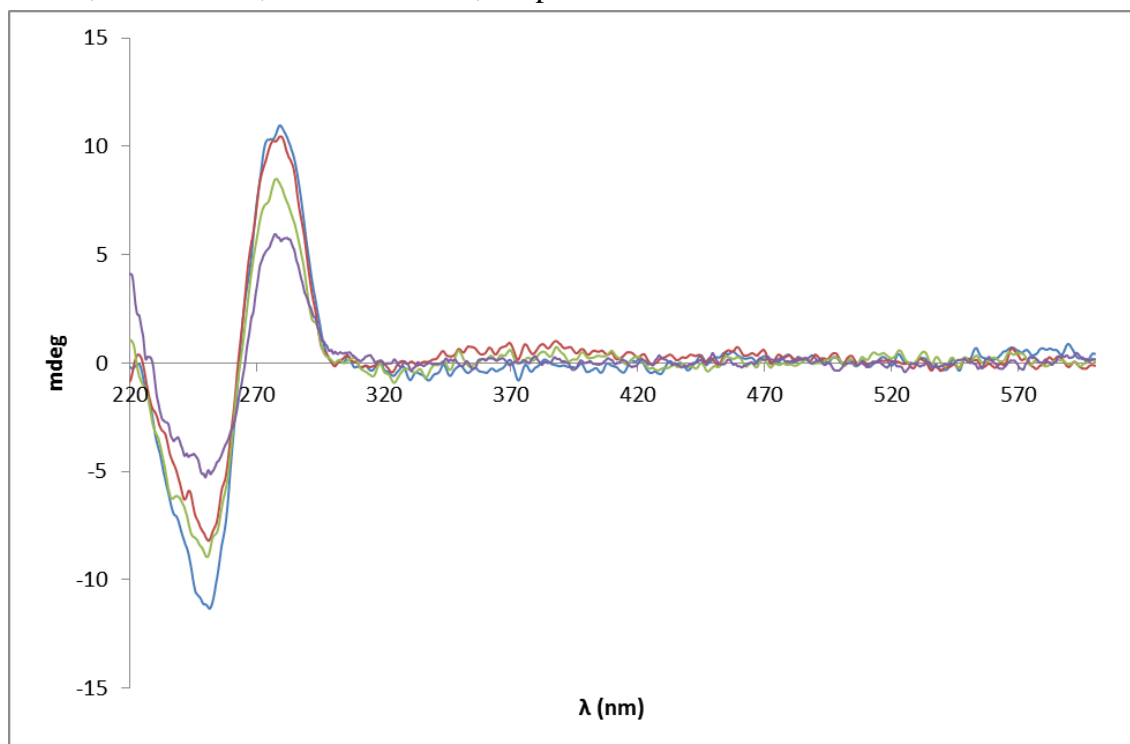


T<sub>m</sub> curves - Blue: **7b + 2x1 + 2x3m**; Red: **7b + 2x1m + 2x3m**; Green: **8b + 2x1 + 2x3 + 2x5m**; Purple: **8b + 2x5m + 2x3m + 2x1m**

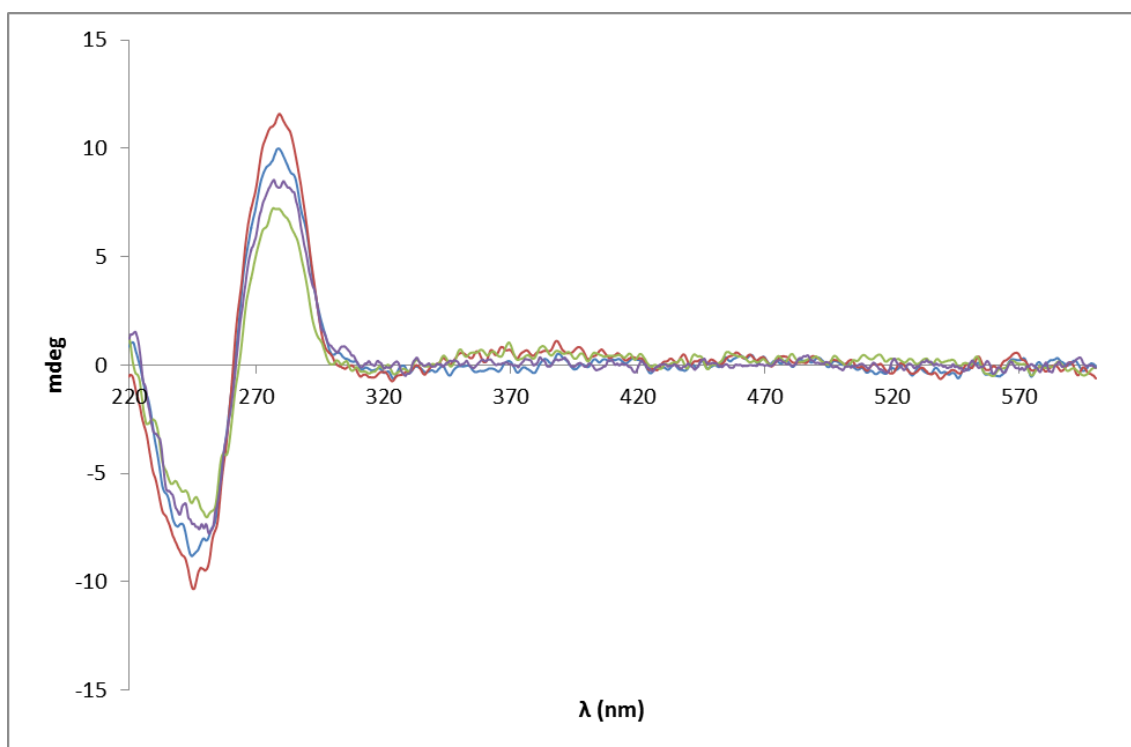
## Circular Dichroism of linear assemblies



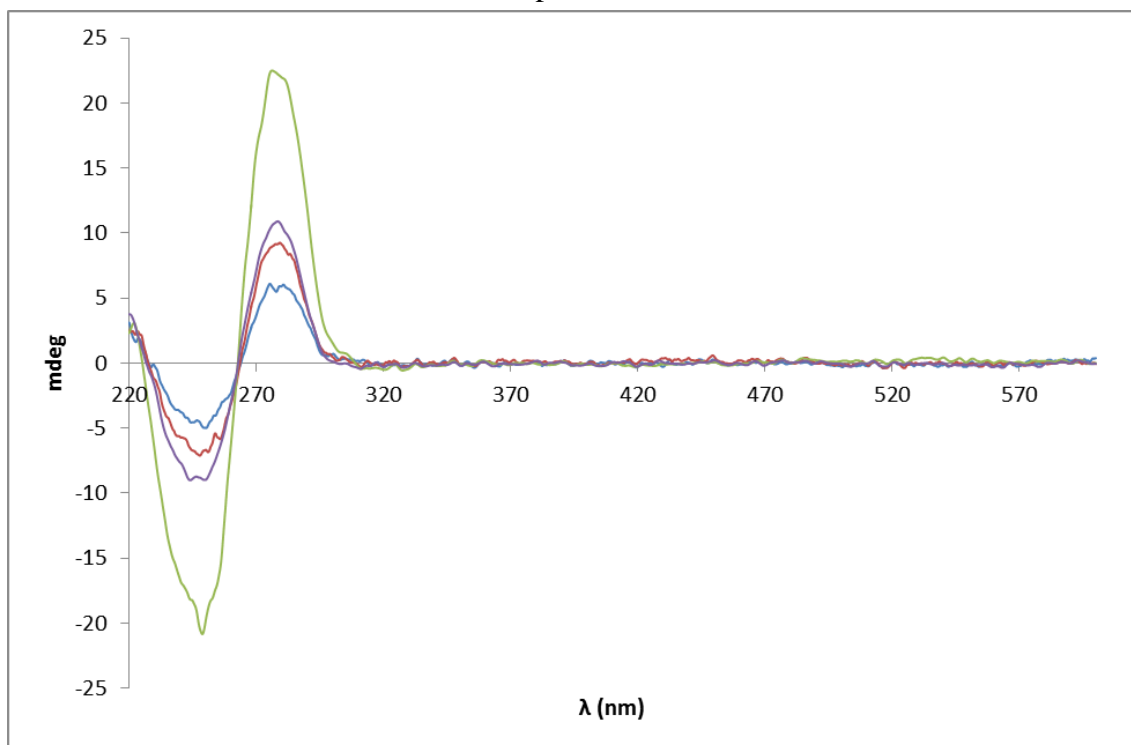
Red: **1+2**; Blue: **1m+2**; Green: **1m+2m**; Purple: **2b+2x1m**



Red: **3+4**; Blue: **3m+4**; Green: **3m+4m**; Purple: **4b+2x3m**



Red: **5+6**; Blue: **5m+6**; Green: **5m+6m**; Purple: **6b+2x5m**



Red: **7b+2x1+2x3m**; Blue: **7b+2x1m+2x3m**; Green: **8b+2x1+2x3+2x5m**; Purple: **8b+2x1m+2x3m+2x5m**