Supplementary Materials:

"Chain Size and Knots of Ring Polymers in All-crossing and Intra-crossing Melts"

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Table S1. Simulation parameters for different chain lengths N of the two systems. L_{box}, τ_{eq} and τ_{run} are the cubic simulation box size, the equilibration time, and the time used for collecting data, respectively.

N	L_{box}	**all-crossing**		**intra-crossing**	
		τ_{eq}	τ_{run}	τ_{eq}	τ_{run}
10	20	5.0×10^4	5.0×10^4	5.0×10^4	5.0×10^4
20	20	8.0×10^4	8.0×10^4	8.0×10^4	8.0×10^4
40	20	1.0×10^5	1.0×10^5	1.0×10^5	1.0×10^5
50	20	2.0×10^6	2.0×10^6	2.0×10^6	2.0×10^6
100	20	2.0×10^6	2.0×10^6	2.0×10^6	2.0×10^6
150	30	2.0×10^6	4.0×10^6	2.0×10^6	4.0×10^6
200	40	1.0×10^7	8.0×10^6	1.0×10^7	8.0×10^6
300	30	1.5×10^7	1.5×10^7	2.0×10^7	2.0×10^7
500	40	2.5×10^7	$1..0\times10^8$	3.0×10^7	1.0×10^8
600	60	6.0×10^7	5.0×10^7	6.0×10^7	5.0×10^7
800	60	1.0×10^8	6.0×10^7	1.0×10^8	6.0×10^7
900	60	1.0×10^8	9.0×10^7	1.0×10^8	9.0×10^7
1000	60	1.0×10^8	1.0×10^8	2.0×10^8	1.0×10^8
1200	60	8.0×10^7	1.0×10^8	8.0×10^7	1.0×10^8
1500	60	8.0×10^7	1.5×10^8	8.0×10^7	2.0×10^8
1800	60	8.0×10^7	2.0×10^8	8.0×10^7	2.0×10^8
2000	60	1.0×10^8	2.5×10^8	1.0×10^8	3.0×10^8
2400	60	1.5×10^8	4.0×10^8	2.0×10^8	4.0×10^8

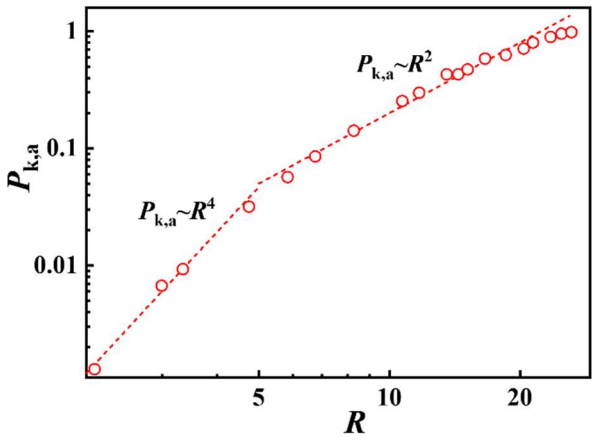


Figure S1. Scaling relation of knotting probability $P_{k,a}$ with chain size R for ring polymers in all-crossing systems.

As shown in Figure S1, the scaling exponent of R for $P_{k,a}$ decreases from 4 to 2 with the increasing R for ring polymers in all-crossing systems.