Table S1 Parameters of Different Types of PE Polymers

Type	Density（g/cm^3）	Crystallinity（%）	Chemical formula
HDPE（High Density Polyethylene）	0.950	85~95	$(CH_2CH_2)_x$
MDPE（Medium Density Polyethylene）	0.935	70~85	
LDPE（Low Density Polyethylene）	0.920	65~75	
LLDPE（Linear Low Density Polyethylene）	0.918	55~65	
ULDPE（Ultra Low Density Polyethylene）	0.905	20~55	

Table S2 Mesophase parameters of MP modified by different additive dosages of HDPE

simple	number	area（μm^2）	diameter（μm）
MP-HDPE-2%	120	1591	13.26
MP-HDPE-4%	85	10597	124.67
MP-HDPE-6%	735	46005	62.59
MP-HDPE-8%	225	17733	78.81
MP-HDPE-10%	762	22280	29.24

Table S3 XRD structure parameters of different additions of PE modified MP

simple	$2\theta_{002}$/(°)	θ_{002}/(°)	β	d_{002}/nm	Lc/nm	N	n
MP-HDPE-2%	24.35	12.18	5.88	0.83	1.99	3.83	4.69
MP-HDPE-4%	22.40	11.20	9.59	3.78	5.10	9.89	31.29
MP-HDPE-6%	22.69	11.35	10.67	2.24	2.75	5.98	11.46
MP-HDPE-8%	22.69	11.35	9.29	2.25	3.17	6.42	13.20
MP-HDPE-10%	24.16	12.08	2.16	0.87	5.63	7.50	18.01

Table S4 The GPC average molecular weight

simple	Mn	Mw	Mz	Mzl	Mw/Mn	Mz/Mw
MP-HDPE-6%	220	16913	600324	930057	76.78812	35.49487

Number Average Molecular Weight（Mn）：The average molecular mass calculated based on the number of molecules.

Weight Average Molecular Weight（Mw）：The average molecular weight calculated based on the mass ratio.

z-Average Molecular Weight（Mz）：The average molecular weight calculated based on the third power of mass.

z1-Average Molecular Weight（Mz1）：The average molecular weight calculated based on the fourth power of mass.

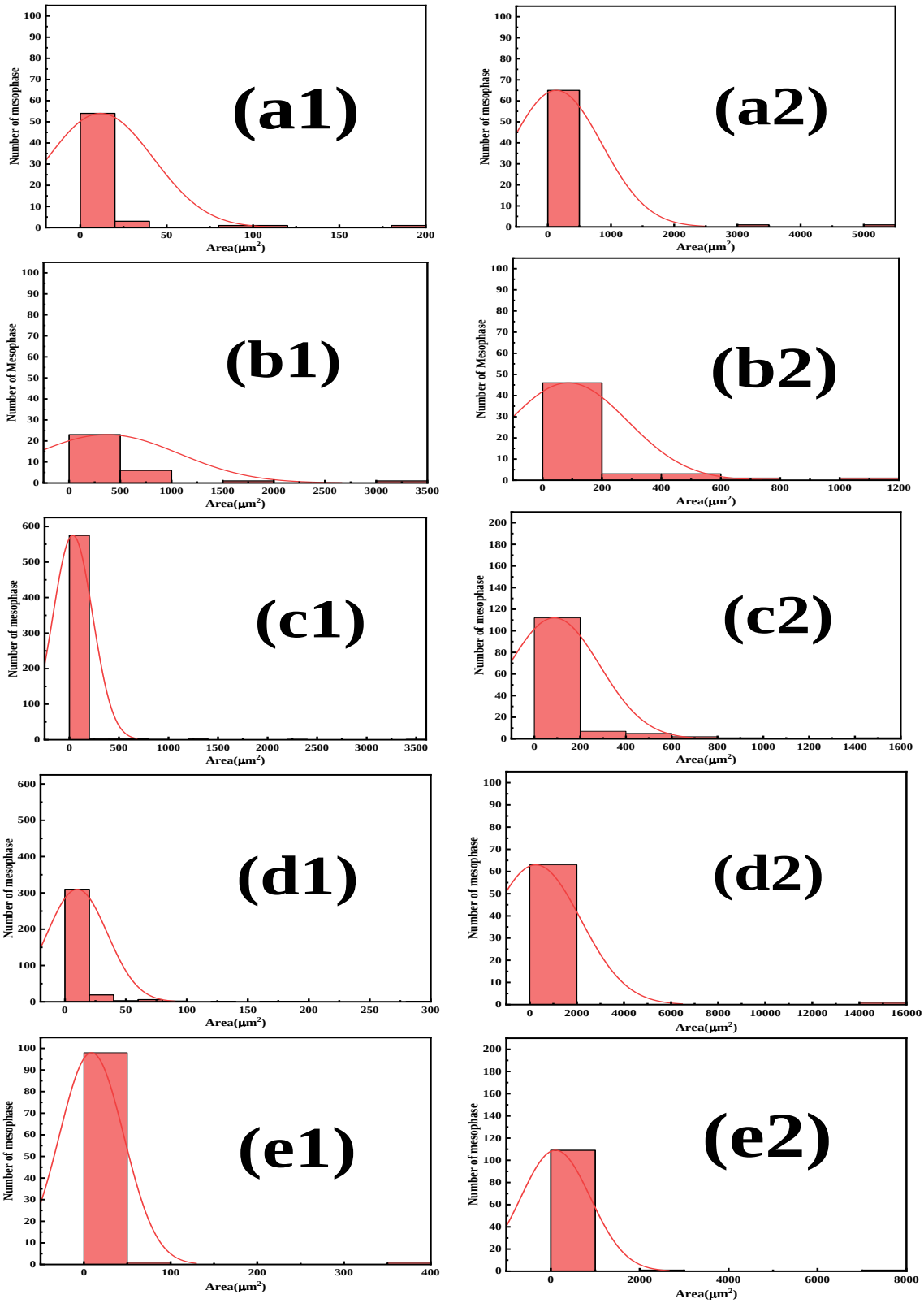


Fig. S1 Mesophase area modified by different types of PE

（a1-a2）MP-HDPE;（b1-b2）MP-MDPE;（c1-c2）MP-LDPE;

（d1-d2）MP-LLDPE;（e1-e2）MP-ULDPE

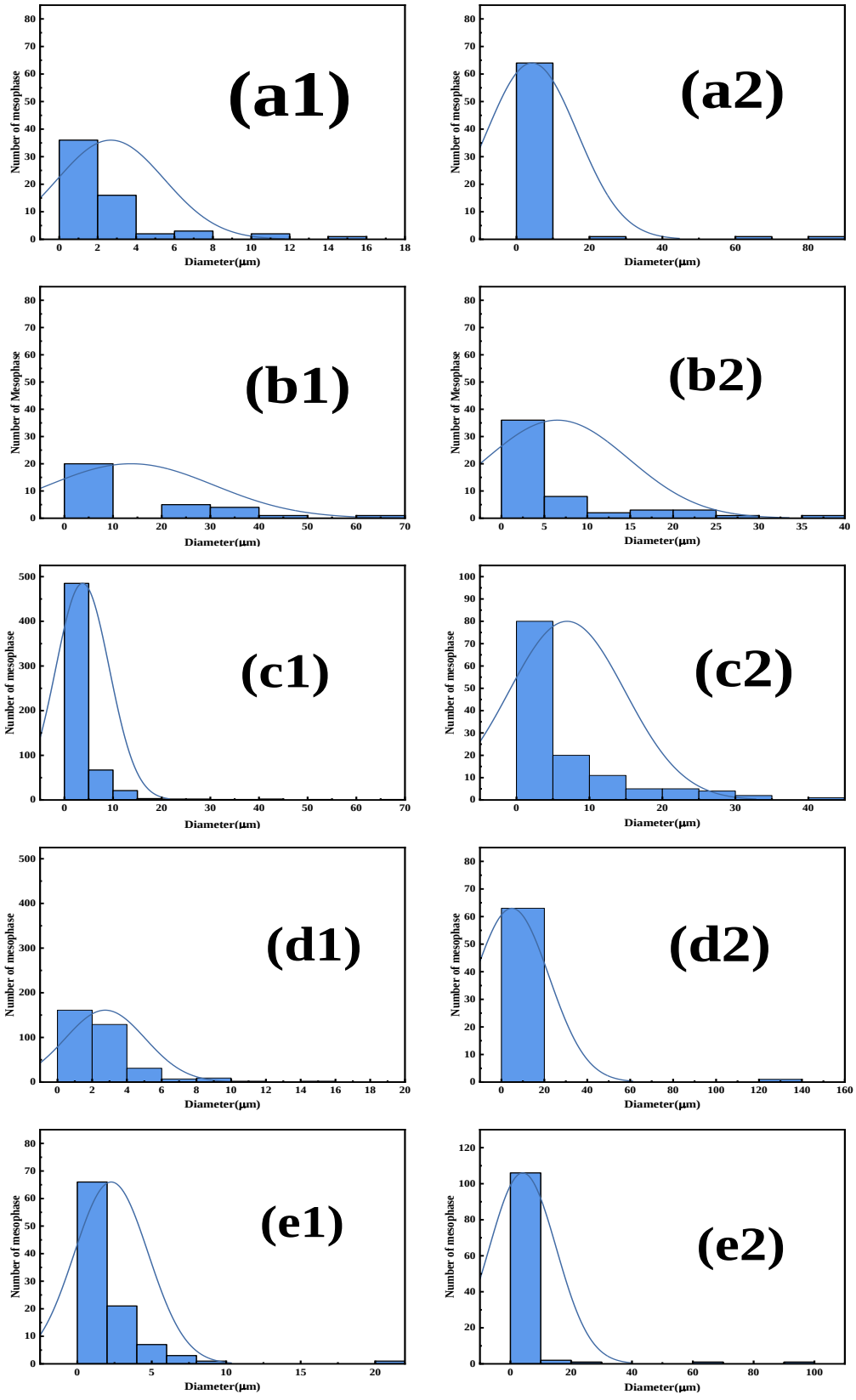


Fig. S2 Mesophase sphere diameters modified by different types of PE

（a1-a2）MP-HDPE;（b1-b2）MP-MDPE;（c1-c2）MP-LDPE;

（d1-d2）MP-LLDPE;（e1-e2）MP-ULDPE

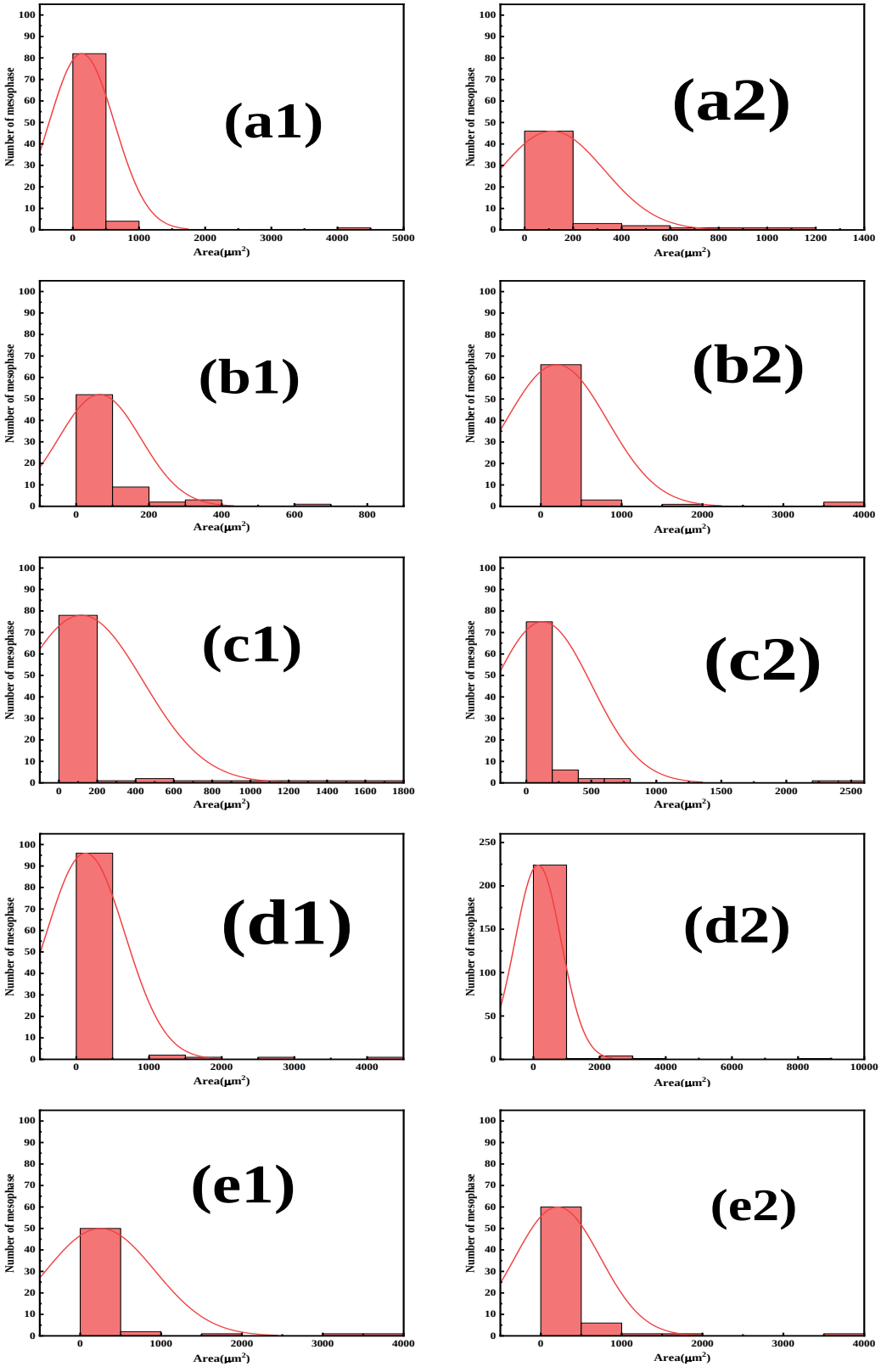


Fig. S3 Mesophase sphere diameters at different HDPE dosages

（a1-a2）MP-HDPE-2%;（b1-b2）MP-HDPE-4%;（c1-c2）MP-HDPE-6%;

（d1-d2）MP-HDPE-8%;（e1-e2）MP-HDPE-10%.

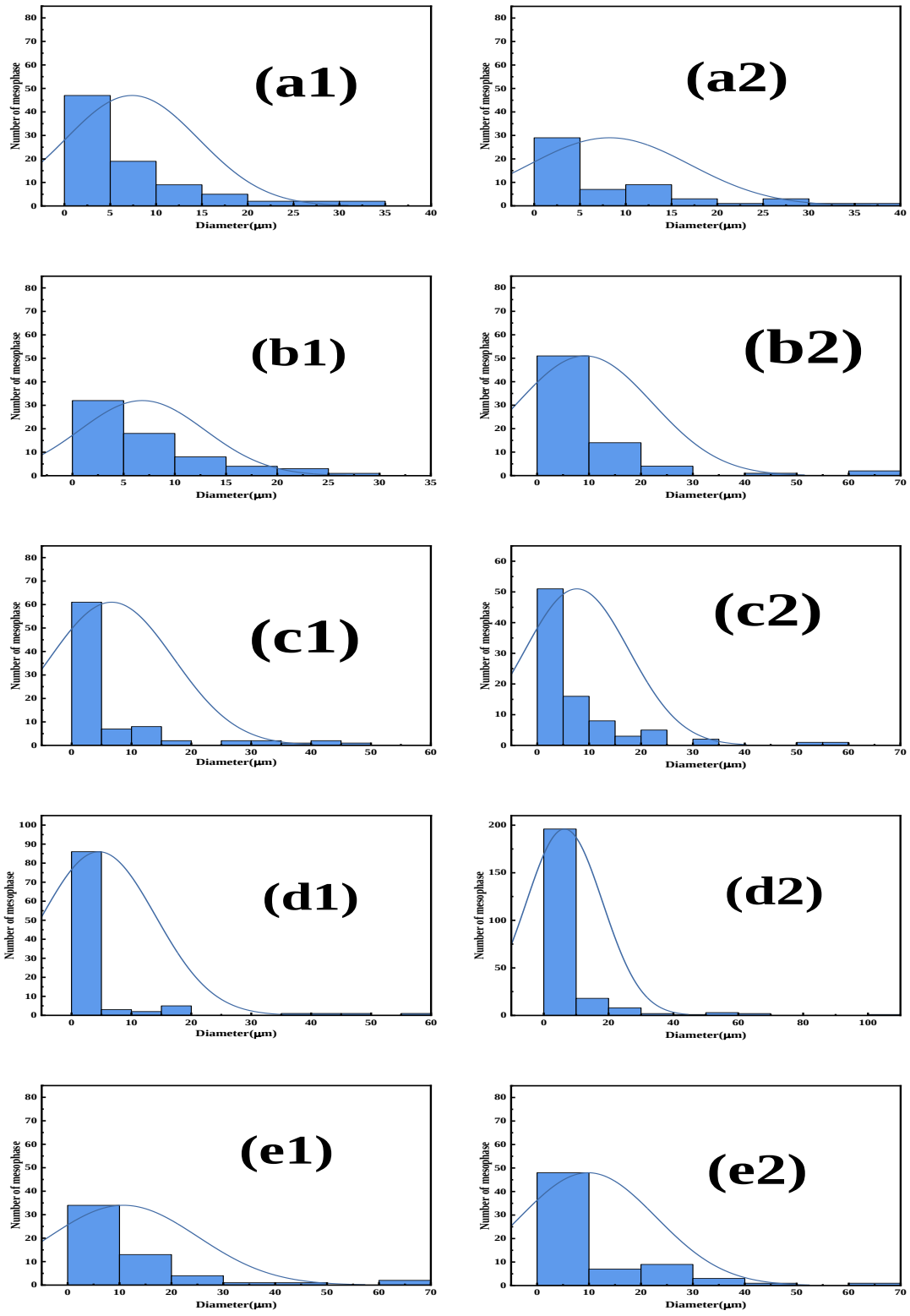


Fig. S4 Mesophase sphere diameters at different HDPE dosages

（a1-a2）MP-HDPE-2%;（b1-b2）MP-HDPE-4%;（c1-c2）MP-HDPE-6%;

（d1-d2）MP-HDPE-8%;（e1-e2）MP-HDPE-10%.