Fullerene (C_{60}) systems

(1) Materials

Alkali metal doped systems A_xC_{60}

x=1

Compounds	structure	lattice parameters	properties	ref.
K_1C_{60}	fcc	a=14.07 Å (473K)	monomeric phase (T>400 K)	1
	orthorhombic	a=9.109 Å, b=9.953 Å, c=14.321 Å	1D-polymer, metal	2
	monoclinic	a=17.153 Å, b=9.793 Å, c=19.224 Å, β=124.1	dimeric phase	3, 4
Rb_1C_{60}	fcc	a=14.08 Å (473K)	monomeric phase(T>400 K)	1,5
	orthorhombic	a=9.138 Å, b=10.107 Å, c=14.233 Å	1D-polymer, SDW(Tn=50K)	2
	monoclinic	a=17.141 Å, b=9.929 Å, c=19.227 Å, β=124.4	dimeric phase	3, 4
Cs_1C_{60}	fcc	a=14.115 Å (473K)	monomeric phase (T>400 K)	6
	fcc		monomeric phase (T<100 K),metal	6
	orthorhombic	a=9.095 Å, b=10.225 Å, c=14.173 Å	1D-polymer, SDW(Tn=50K)	6
	monoclinic		dimeric phase	6
$Na(THF)_5C_{60}$				7
$Na_x(THF)_yC_{60}$	hexagonal	a=15.331 Å, c=9.965 Å	metal (x~0.4, y~2.2)	8

x=2

Compounds	structure	lattice parameters	properties	ref.
Na_xC_{60}	fcc -> sc	a=14.189 Å	1<x<3	9
Na_2C_{60}	fcc -> sc	a=14.19(1) Å	MI transition at 50K	
$(NH_3)_8Na_2C_{60}$	rhombohedral	a=12.221 Å, c=22.296 Å		10

x=3

Compounds	structure	lattice parameters	properties	ref.
Li_2RbC_{60}	fcc	a=13.896 Å		11, 12
Li_2CsC_{60}	fcc	a=14.075 Å		11, 12
Li_3CsC_{60}	fcc	a=14.080 Å	sc Tc=10.5K	13
Na_3C_{60}	fcc	a=14.191 Å		14
Na_2KC_{60}	fcc -> s.c.	a=14.122 Å	sc Tc=2.5K	11, 12
Na_2RbC_{60}	fcc -> s.c.	a=14.092 Å	sc Tc=3.5K	11, 12
	monoclinic	a=13.711 Å, b=14.554 Å, c=9.373 Å, β=133.53	1D-polymer	15, 16
$Na_2Rb_{0.3}Cs_{0.7}C_{60}$	monoclinic		1D-polymer, antiferromagnet T_N=15K	

Na_2CsC_{60}	fcc -> s.c.	a=14.126 Å	sc Tc=12K	11, 12
K_3C_{60}	fcc	a=14.240 Å	sc Tc=19K	17, 18
$K_xRb_{3-x}C_{60}$	fcc		sc, 0<x<3	19
K_2CsC_{60}	fcc	a=14.292 Å	sc Tc=24K	19
Rb_3C_{60}	fcc	a=14.384 Å	sc Tc=29K	20
Rb_2CsC_{60}	fcc	a=14.431 Å	sc Tc=31K	19
$RbCs_2C_{60}$	fcc	a=14.555 Å	sc Tc=33K	20
Cs_3C_{60}	bco	a=14.126 Å	sc under pressure Tc=40K	21, 22
$(NH_3)_4Li_3C_{60}$	bcc	a=11.843 Å		23
$(NH_3)_6Na_3C_{60}$	bcc	a=14.126 Å	localized	24
$(NH_3)_4Na_2Cs\ C_{60}$	fcc	a=14.473 Å	sc Tc=30K	25
$(NH_3)_xNaK_2C_{60}$	fcc	a=14.35-14.40 Å	sc 8K<Tc<13K, 0.5<x<1	26
$(NH_3)_xNaRb_2C_{60}$	fcc	a=14.50-14.53 Å	sc 8.5K<Tc<17K, 0.5<x<1	26
$(NH_3)K_3C_{60}$	bco	a=14.126 Å	AF below 40K, sc under pressure Tc=28K	27, 28, 29
$(NH_3)_xK_3C_{60}$	fcc	a=14.32 Å	sc Tc=8.5K, 0<x<1	30
$(NH_3)_8K_3C_{60}$	bct	a=12.15 Å, c=15.7 Å		28
$(NH_3)_xRb_3\ C_{60}$				23
$Na_xN_y\ C_{60}$	fcc	a=14.204 Å	sc Tc=12K	31
$Na_xH_y\ C_{60}$	fcc -> s.c.	a=14.356 Å	sc Tc=15K	32
	tetragonal	a=10.153 Å, c=14.336 Å		33

x=4

Compounds	structure	lattice parameters	properties	ref.
Na_4C_{60}	monoclinic	a=11.235 Å, b=11.719 Å, c=10.276 Å, β=96.16	2D-polymer, monomer at T>500K	34,35
K_4C_{60}	bct	a=11.886 Å, c=10.774 Å	semiconducting	36,37
Rb_4C_{60}	bct	a=11.962 Å, c=11.022 Å	semiconducting	36,37
Cs_4C_{60}	bco	a=12.150 Å, b=11.905 Å, c=11.452 Å	semiconducting	36,38

x=6

Compounds	structure	lattice parameters	properties	ref.
Na_6C_{60}	fcc	a=14.248 Å	semiconducting	14
K_6C_{60}	bcc	a=11.390 Å	semiconducting	39
Rb_6C_{60}	bcc	a=11.548 Å	semiconducting	37
Cs_6C_{60}	bcc	a=11.790 Å	semiconducting	39,37

x>6

Compounds	structure	lattice parameters	properties	ref.
$Na_{9.7}C_{60}$	fcc	a=14.59 Å		40
$Li_{12}C_{60}$	fcc - > tetragonal	a=14.09 Å (553K)		41

Alkaline-earth metal doped systems

Compounds	structure	lattice parameters	properties	ref.
$Ca_{2.75}C_{60}$	orthorhombic	a=27.93 Å, b=28.03 Å, c=27.95 Å		42
Ca_5C_{60}	s.c.	a=14.01 Å	sc Tc=8.4K	43
Sr_3C_{60}	fcc	a=14.144 Å		44
	A15	a=11.140 Å		44
Sr_4C_{60}	bco		sc Tc=4K	45
Sr_6C_{60}	bcc	a=10.975 Å		44
Ba_3C_{60}	A15	a=11.343 Å		46
Ba_4C_{60}	bco	a=11.610 Å, b=11.234 Å, c=10.882 Å	sc Tc=7.0K	47, 48
Ba_6C_{60}	bcc	a=11.171 Å		49
$CsBa_2C_{60}$	fcc	a=14.190 Å		50
$K_{3-x}Ba_xC_{60}$	fcc		sc	51
$KBaCsC_{60}$	fcc			51
$K_3Ba_3C_{60}$	bcc	a=11.245 Å	sc Tc=5.6K	52
$Rb_3Ba_3C_{60}$	bcc	a=11.338 Å	sc Tc=2.0K	53
$Cs_3Ba_3C_{60}$	bcc	a=11.472 Å		53
$(NH_3)_8BaC_{60}$	rhombohedral	a=12.223 Å, c=21.461 Å		54

Rare-earth metal doped systems

Compounds	structure	lattice parameters	properties	ref.
$Yb_{2.75}C_{60}$	orthorhombic	a=27.87 Å, b=27.98 Å, c=27.87 Å	sc Tc=6K , vacancy ordering	55
Sm_xC_{60}	orthorhombic	a=28.17 Å, b=28.07 Å, c=28.27 Å	sc Tc=8K, x~3	56
Sm_6C_{60}	bcc	a=10.890 Å	metallic	
Eu_xC_{60}			x=3, 6	57
La_xC_{60}			sc Tc=12.5K	58

(2) Superconducting Properties

Pressure and magnetic field effects

Parameter	K3C60	Rb3C60	reference
fcc a(Å)	14.253	14.436	
T_c(K)	19.7	30	

$(dT_c/dP)_{p=0}$ (K/GPa)	-7.8	-9.7	59
$H_{c1}(0)$(mT)	13	26, 19	60,61
$H_{c2}(0)$(T)	26,30,29,17.5	34, 55, 76	60, 62, 63, 64
Jc(10^6A/cm^2)	0.12	1.5	60
ξ_0(nm)	2.6,3.1,3.4,4.5	2.0, 2.0, 3.0	59, 62, 63, 64
λ_L(nm)	240, 480, 600, 800	168, 370, 460, 800, 210	60, 61, 66, 67, 67, 68, 69, 70
$\kappa = \lambda_L / x_0$	92	84, 90	
dH_{c2}/dT (T/K)	-1.34	-3.8	64, 71
l (nm)	3.1, 1.0	0.9	72

Superconducting gap

$2D/k_BTc$	material and method	references
5.2	K_3C_{60} (STM)	73
5.3	Rb_3C_{60} (STM)	74
3.0	K_3C_{60} (NMR)	68
4.1	Rb_3C_{60} (NMR)	68
3.6	Rb_3C_{60} (mSR)	66
4.1	Rb_3C_{60} (photoemission)	75
3.44	K_3C_{60} & Rb_3C_{60} (optical)	69, 70
2-4	Rb_3C_{60} single crystal	76
3.2~0.5	Rb_2CsC_{60} polycrystalline (STM)	77

Isotope effect

a	material and method	references
0.30±0.06	K_3C_{60} & Rb_3C_{60}, full substitution (99%)	78, 79
0.8	Rb_3C_{60}, partial molecular substitution (50%)	79
1.4±0.5	Rb_3C_{60}, partial atomic substitution (33%)	80
1.2±0.2	K_3C_{60}, partial atomic substitution (60%)	81
2±0.25	Rb_3C_{60}, partial atomic substitution (60%)	81
1.45±0.3	Rb_3C_{60}, partial atomic substitution 82%)	82
0.37±0.05	Rb_3C_{60}, partial atomic substitution (10%) and molecular substitution (15%)	83