

**Landolt-Börnstein**  
**Group II: Molecules and Radicals**

**Volume 9**  
**Magnetic Properties of Free Radicals**

**Subvolume B**  
**Organic C-Centered Radicals**

Title Page, Preface

General introduction (H. FISCHER) 1

3 Nonconjugated carbon radicals (H. FISCHER, H. PAUL) 5

3.0 Introduction 5

3.1 Alkyl radicals 7

3.1.1 Primary alkyl radicals 7

3.1.2 Noncyclic secondary alkyl radicals 80

3.1.3 Noncyclic tertiary alkyl radicals 179

3.1.4 Monocyclic alkyl radicals 253

3.1.5 Polycyclic alkyl radicals 295

3.2  $\sigma$ -electronic carbon radicals 303

3.2.1 Vinyl-type radicals 303

3.2.2 Aryl radicals 310

3.2.3 Acyl radicals 318

3.3 References for 3.1 and 3.2 325

4 Carbon radicals with conjugated  $\pi$ -systems (A. BERNDT) 342

4.1 Introduction 342

4.2 Radicals with 3 conjugated  $\pi$ -electrons 345

4.2.1 Allyl and deuterated allyl radicals 345

4.2.2 Alkyl-substituted allyl radicals 346

4.2.3 Allyl radicals containing F, Cl, Br 354

4.2.4 Allyl radicals containing O 358

4.2.5 Allyl radicals containing S 377

4.2.6 Allyl radicals containing N and P 380

4.2.7 Allyl radicals containing Si, Ge, and Sn 383

4.2.8 Methylene allyl radicals 387

4.2.9 Iminoallyl radicals 387

4.2.10 Phenyl- and aryl-substituted allyl radicals 389

4.2.11 Aza-allyl and phospho-allyl radicals 401

4.2.12 Semicyclic allyl radicals 402

4.2.13 Cyclopropenyl radicals 404

4.2.14 Isocyclic allyl radicals 405

4.2.15 Heterocyclic allyl radicals 414

4.2.16 Bicyclic and tricyclic allyl radicals 426

4.2.17 References to further papers concerning ESR studies on allyl radicals 430

4.2.18	Allenyl (propargyl) radicals	430
4.2.19	References to further papers concerning ESR studies on allenyl radicals	435
4.3	Radicals with 5 conjugated $\pi$ -electrons	435
4.3.1	Pentadienyl radicals	435
4.3.2	Pentadiinyl radicals	437
4.3.3	Semicyclic pentadienyl radicals	437
4.3.4	Cyclopentadienyl radicals	438
4.3.5	References to further papers concerning ESR studies on cyclopentadienyl radicals	451
4.3.6	Cyclohexadienyl radicals	452
4.3.7	References to further papers concerning ESR studies on cyclohexadienyl radicals	494
4.3.8	Pyryl radicals	495
4.3.9	References to further papers concerning ESR studies on pyryl radicals	505
4.3.10	Thiapyryl radicals	505
4.3.11	Pyridinyl radicals	509
4.3.12	References to further papers concerning ESR studies on pyridinyl radicals	531
4.3.13	Phosphorinyl radicals	531
4.4	Radicals with 7 conjugated $\pi$ -electrons	535
4.4.1	Heptatrienyl radicals	535
4.4.2	Cycloheptatrienyl radicals	537
4.4.3	Cyclooctatrienyl radicals	543
4.4.4	Benzyl radicals	543
4.4.5	Benzyl-type radicals containing heterocyclic 6 $\pi$ -electron ring systems	601
4.4.6	Bicyclic benzyl-type radicals derived from indanone and phthalide	613
4.4.7	References to further papers concerning ESR studies on benzyl radicals	615
4.5	Radicals with 9 conjugated $\pi$ -electrons	616
4.5.1	Cyclooctatetraenylmethyl	616
4.5.2	Indenyl and related radicals	616
4.5.3	alpha-Hydronaphthyl and related radicals	617
4.5.4	Cyclohexadienyl-type radicals derived from indole and carbazole	620
4.5.5	beta-Hydronaphthyl and related radicals	621
4.5.6	Quinoliny and related radicals	622
4.5.7	Cyclohexadienyl-type radicals derived from anthracene and phenanthrene and related to hydro-naphthyl	625
4.6	Radicals with 11 conjugated $\pi$ -electrons	626
4.7	Radicals with 13 conjugated $\pi$ -electrons	627
4.7.1	Phenalenyl (perinaphthenyl) radicals	627
4.7.2	Diphenylmethyl radicals	635
4.7.3	Fluorenyl radicals	674
4.7.4	Dibenzocyclohexadienyl and related radicals	689
4.7.5	Dibenzocycloheptatrienyl and related radicals	690
4.7.6	Benzo[cd]pyrenyl	692
4.7.7	Xanthy radicals	692
4.7.8	Thioxanthy and related radicals	699

4.7.9	Selenoxanthyl and related radicals	703
4.7.10	Acridinyl and related radicals	704
4.7.11	Dibenzosilacyclohexadienyl and related radicals	706
4.7.12	Diphenylmethyl-type radicals containing heterocyclic 6 $\pi$ -electron ring systems	706
4.7.13	References to further papers concerning ESR studies on diphenylmethyl radicals	718
4.8	Radicals with 19 conjugated $\pi$ -electrons	718
4.8.1	Triphenylmethyl radicals	718
4.8.2	9-Phenylfluorenyl radicals	751
4.8.3	9-Phenylxanthyl radicals	753
4.8.4	9-Naphthylxanthyl radicals	756
4.8.5	Dioxydehydrocoranthyryl and sesquioxanthryl	757
4.8.6	9-Phenylthioxanthyl	758
4.8.7	9-Phenylselenoxanthyl	760
4.8.8	9-Phenylacridinyl	761
4.8.9	Triphenylmethyl-type radicals containing 5-membered ring systems especially thiophene	761
4.8.10	References to further papers concerning ESR studies on triphenylmethyl radicals	764
4.9	References for 4	765
	Index of Substances (See Vol. 9D2)	