

**Table 5.2. Water Solubility of Dicarboxylic Acids**

$$\text{HO}_2\text{C}-(\text{CH}_2)_{x-2}\text{CO}_2\text{H}$$

Even number (x) of carbon atoms	m.p. (°C)	Solubility (g/100 g water at 20°C)	Odd number (x) of carbon atoms	m.p. (°C)	Solubility (g/100 g of water at 20°C)
Oxalic (2)	189	9.5	Malonic (3)	135	73.5
Succinic (4)	185	6.8	Glutaric (5)	97	64
Adipic (6)	153	2	Pimelic (7)	103	5
Suberic (8)	140	0.16	Azelaic (9)	106	0.24
Sebacic (10)	133	0.10			

**Table 5.3. Water Solubility of Various Organic Compounds**

Types of compounds	General formula	Soluble	Borderline	Insoluble
Acids	RCO <sub>2</sub> H	Pivalic (C <sub>5</sub> )	Isovaleric (C <sub>5</sub> )	n-Valeric (C <sub>5</sub> )
Acid chlorides	RCOCl	Isobutyryl (C <sub>4</sub> )	n-Butyryl (C <sub>4</sub> )	
Alcohols	ROH	Neopentyl (C <sub>5</sub> )	2-Methyl-3-butanol (C <sub>5</sub> )	n-Amyl (C <sub>5</sub> )
Amides	RCONH <sub>2</sub>	Isobutyramide (C <sub>4</sub> )	n-Butyramide (C <sub>4</sub> )	
Esters	RCO <sub>2</sub> R'	Isopropyl acetate (C <sub>5</sub> )	n-Propyl acetate (C <sub>5</sub> )	
Ketones	RCOR'	Isopropyl methyl (C <sub>5</sub> )	Methyl n-propyl (C <sub>5</sub> )	
Nitriles	RCN		Isobutyronitrile (C <sub>5</sub> )	n-Butyronitrile (C <sub>5</sub> )

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**Table 5.4. Solubility Classes of Various Organic Acids**

Compounds		
Name	General structure	Solubility class <sup>a</sup>
Carboxylic acids	RCO <sub>2</sub> H	A <sub>1</sub>
Sulfonic acids	RSO <sub>3</sub> H	A <sub>1</sub>
Sulfinic acids	RSO <sub>2</sub> H	A <sub>1</sub>
Enols	$\begin{array}{c}   \quad   \\ \text{---C=C---OH} \end{array}$	A <sub>2</sub>
Imides	$\begin{array}{c} \text{O} \quad \text{O} \\    \quad    \\ \text{---C---NH---C---} \end{array}$	A <sub>2</sub>
Nitro <sup>b</sup>	$\begin{array}{c} \diagup \quad \diagdown \\ \text{CH---NO}_2 \end{array}$	A <sub>2</sub>
Arenesulfonamides <sup>c</sup>	ArSO <sub>2</sub> NHR	A <sub>2</sub>
β-Dicarbonyl compounds <sup>d</sup>	$\begin{array}{c} \text{O} \quad \text{O} \\    \quad    \\ \text{---C---CH---C---} \\   \end{array}$	A <sub>2</sub> <sup>e</sup>
Oximes	$\begin{array}{c} \diagup \quad \diagdown \\ \text{C=N---OH} \end{array}$	A <sub>2</sub>

<sup>a</sup> Borderline cases are named in Table 5.5.

<sup>b</sup> Primary (RCH<sub>2</sub>NO<sub>2</sub>) and secondary (R<sub>2</sub>CHNO<sub>2</sub>) nitroalkanes only.

<sup>c</sup> The acidity of the N—H proton is utilized in the Hinsberg test (Procedure 19). This category also includes sulfonamides of ammonia and other sulfonamides of primary amines.

<sup>d</sup> Highly electronegative groups, e.g., trifluoromethyl, on the carbonyl group can move these compounds into class A<sub>1</sub>.