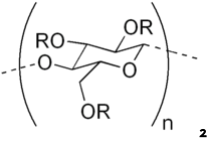


## CELLULOSE ETHERS USED IN CONSERVATION<sup>1</sup>

Hydroxyl groups (-OH) of cellulose can be partially or fully reacted with various reagents to create derivatives including cellulose esters and cellulose ethers. [Table after Feller and Baker]

Cellulose Ether	Formula  Group R (generic unspecific alkyl group) equals H or:	Name	Common Conservation Name	Alternate Names	Common Use	Solubility	CAS Registry Number:
Alkyl	-CH <sub>3</sub>	Methyl cellulose <sup>3</sup>	Culminal MC Methocel	MC; Methylcellulose ; Cellulose, methyl ether; Methylated cellulose	Adhesive; Consolidant; Poultice; Sizing	Soluble in cold water	CAS 9004-67-5
Alkyl	-CH <sub>2</sub> CH <sub>3</sub>	Ethyl cellulose <sup>4</sup>	Ethulose	EC; Ethyl hydroxyethyl cellulose; 2-hydroxyethyl ether of ethyl cellulose; Ethyl-2-hydroxyethylcellulose; Cellulose ethyl hydroxyethyl ether	Ethyl cellulose is rarely used in conservation because it oxidizes readily and is thermally unstable (Feller and Wilt 1990) <sup>9</sup>	Insoluble in water	CAS 9004-58-4
Hydroxyalkyl	-CH <sub>2</sub> CH(OH)CH <sub>3</sub>	Hydroxypropyl cellulose <sup>5</sup>	Klucel G Cellugel	HPC; Cellulose, 2-hydroxypropyl ether; hydropropyl cellulose; Hydroxypropyl cellulose; Hydroxypropyl cellulose ether; Hydroxypropyl ether of cellulose	Adhesive; Consolidant	Soluble in cold water	CAS 9004-64-2
Hydroxyalkyl	-CH <sub>3</sub>	Hydroxypropyl methyl cellulose <sup>6</sup>	Culminal HPC Methocel	HPMC; Hypromellose; Propylene glycol ether of methylcellulose; Methyl ether cellulose; Cellulose, 2-hydroxypropyl methyl ether	Testing indicates that HPC polymers should not be considered for long term use (Feller and Wilt 1990) <sup>7</sup>	Soluble in cold water	CAS 9004-65-3
Carboxyalkyl	-CH <sub>2</sub> COOH	Carboxymethyl cellulose <sup>7</sup>	Aqualon Cellulose Gum 7H	CMC; Cellulose, carboxymethyl ether; Carboxymethylcellulose	Adhesive; Sizing	Soluble in hot and cold water	CAS 9000-11-7
Carboxyalkyl	-CH <sub>2</sub> COONa	Sodium carboxymethyl cellulose <sup>8</sup>	Aqualon Cellulose Gum CMC 7H3SF PH  Cellugel Ophthalmic Viscosurgical Device	NaCMC; SCMC; Sodium carboxymethyl cellulose ; Sodium salt of carboxymethyl cellulose; Cellulose, carboxymethyl ether; CMC sodium salt; Cellulose carboxymethyl ether sodium salt	Adhesive; Sizing	Soluble in hot and cold water	CAS 9004-32-4

1. [http://cameo.mfa.org/wiki/Cellulose\\_ether](http://cameo.mfa.org/wiki/Cellulose_ether)

2. Structure modified from [http://upload.wikimedia.org/wikipedia/commons/d/d2/Methyl\\_cellulose.png](http://upload.wikimedia.org/wikipedia/commons/d/d2/Methyl_cellulose.png)

3. <http://www.ebi.ac.uk/chebi/searchId.do;jsessionid=67F1DCoBB298839C99Bo2o7B72C61FBD?chebiId=53448>

4. <http://chem.sis.nlm.nih.gov/chemidplus/rn/9004-58-4>

5. <http://chem.sis.nlm.nih.gov/chemidplus/rn/9004-64-2#formulas>

6. <http://chem.sis.nlm.nih.gov/chemidplus/rn/9004-65-3>

SReidell NYPL

7. <http://pubchem.ncbi.nlm.nih.gov//compound/24748?from=summary>

8. <http://pubchem.ncbi.nlm.nih.gov/image/fl.html?cid=24748>

9. [http://cameo.mfa.org/wiki/Ethyl\\_cellulose](http://cameo.mfa.org/wiki/Ethyl_cellulose)

10. [http://cameo.mfa.org/wiki/Hydroxypropyl\\_cellulose](http://cameo.mfa.org/wiki/Hydroxypropyl_cellulose)