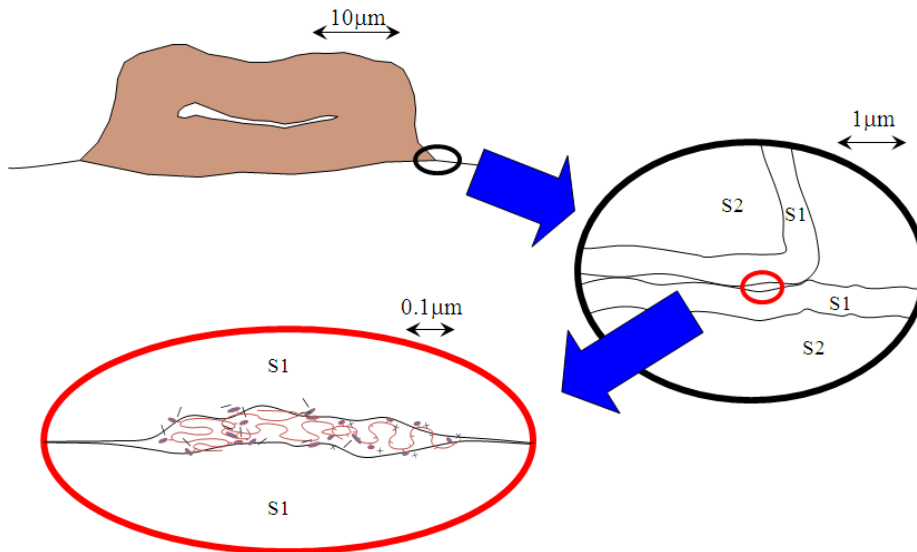


## 호프만전위에 의한 PVAm 건조지력증강제의 적용 평가

류정용, 조병욱, 송봉근

한국화학연구원, 바이오정밀화학연구센터

Current strength requirements on base paper for corrugated board are escalating whilst recovered paper qualities tend to deteriorate. Papermakers are confronted with a growing demand for ever lower basis weights. Both trends call for countermeasures to compensate for strength losses. Paper strength is of paramount importance in corrugated board manufacture and all the more so if production is based on 100% recycled fiber. We need new dry strength agents allowing papermakers to respond to varying and basically deteriorating raw material qualities. Synthetic dry strength agents provide strength by bridging gaps on a molecular level. Without them, the interspace would be too large to permit effective looping of the fibril of different fibers.

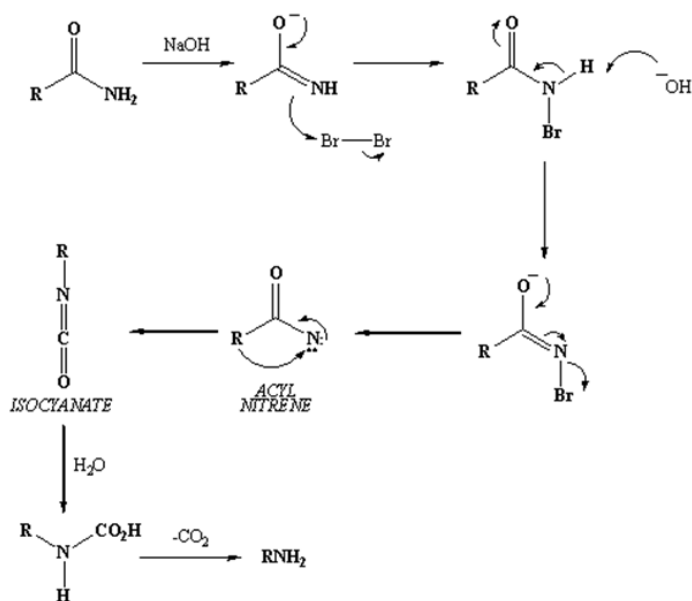


Internal application of cationic starches was proved as insufficient by

OCC recycling mills using contaminated process water. As a rule, furthermore, traditional cationic internal starch can only be dosed in amounts of 1 - 1.5 %. Frequently, papermakers are having difficulty to keep the performance of internal starch unchanged over protracted periods of time. Korean OCC mills employ size presses to enhance paper strength.

Compared to starch, the polymer chain of PVAm is far more flexible and, in relation to its molecular mass, provides a distinctly higher number of potential binding sites. This benefit is also reflected in the ratio of the specific performance of cationic internal starch to that of PVAm. In other words: PVAm considerably outperform cationic internal starches.

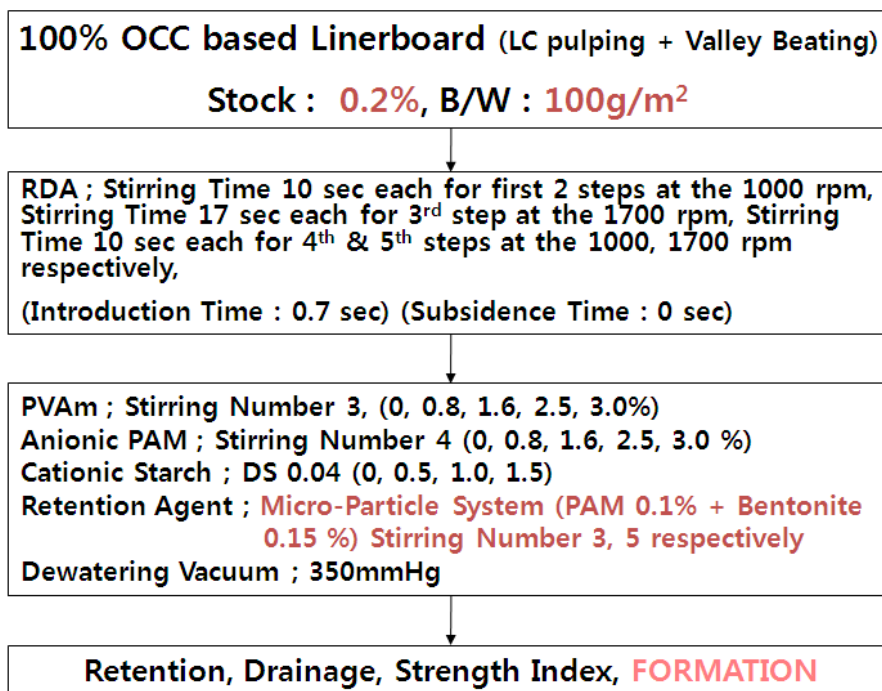
A drawback of new synthetic dry strength agent PVAm was its high cost. However, this was more than compensated for by the new manufacturing process called Hoffman Rearrangement. Production cost reduction was obtained by recent new developments using acryl amide as a monomer of PVAm.

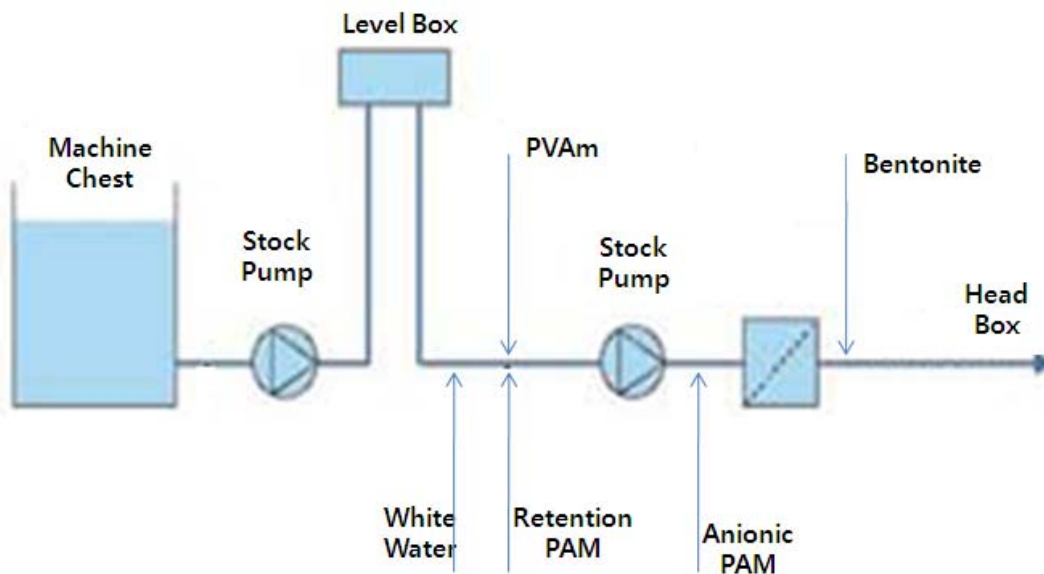


This rearrangement allows for the production of amines from the

corresponding primary amide. Primary amides are treated with base and bromine to generate an isocyanate, which upon hydrolysis yields the desired amine.

In order analyze the efficiency of Hofmann PVAm on the improvement of retention, drainage, uniformity and strength of linerboard, RDA sheet molding was performed as follows.





## Conclusions

PVAm significantly enhances the strength without any deteriorating effects on retention, drainage and uniformity. Paper strength could be improved to a point where operation of size press could be switched to the application of internal dry strength agent, PVAm.

Owing to smoother machine running and higher machine speeds, productivity will be raised more than 10%. At the same time, the complaint rate because of inadequate gluability in the corrugator will be reduced. No internal starch is needed, which will lower the drying energy requirement. Similarly, retention aids become superfluous and steam consumption will be reduced. Variations in anionic trash loads can be successfully compensated for by suitably adapting PVAm.