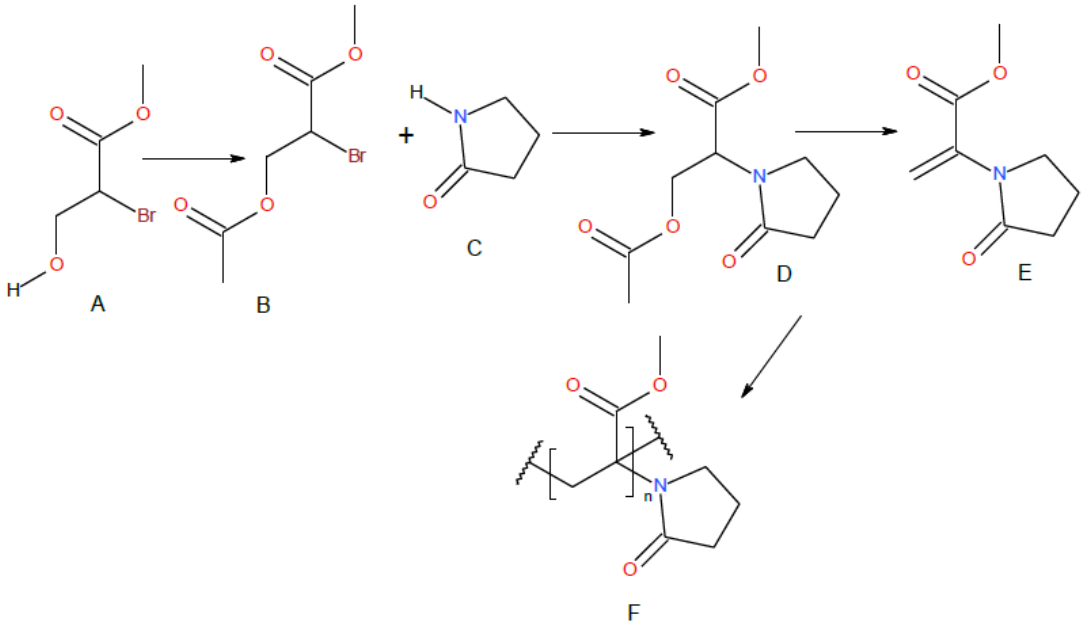
New Pyrrolidone Vinyl Monomers

by: Robert B. Login rloginconsulting.com

What follows are my ideas for new pyrrolidone containing monomers. The first idea is illustrated in scheme 1.



Scheme 1: The pyrrolidone(ie 2-py) can also be attached at the 3 pyrrolidone position in addition to the one position shown above. Obviously other lactams could be used and other synthesis routes maybe preferred.

After searching, I found that this idea was already known.
JP645634B2
"Patent Document 1 describes a vinylpyrrolidone polymer having improved heat yellowing resistance by a polymerization method. Patent Documents 2 and 3 relate to a vinylpyrrolidone resin composition having improved moisture resistance. Have been described.

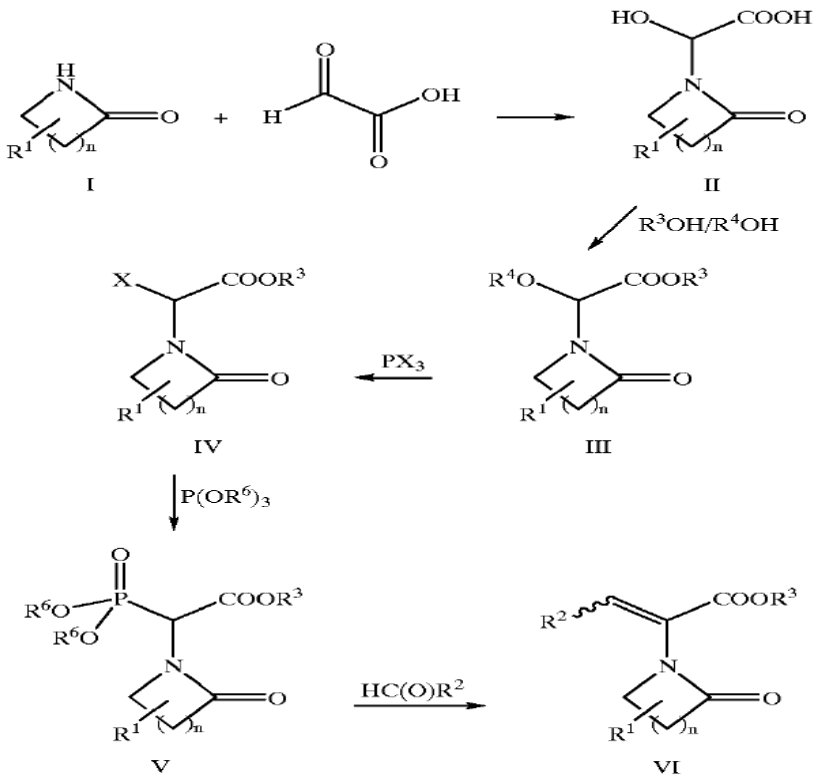
JP 2003-292537 A JP 2003-105159 A JP 2002-173666 A

As described above, various vinylpyrrolidone polymers have been studied. However, the color tone, heat yellowing resistance, and moisture resistance cannot be said to be sufficiently high, and there is room for improvement.
This invention is made | formed in view of the said present condition, and the subject which this invention tends to solve exists in providing the cyclic amide group containing polymer excellent in color tone, heat-resistant yellowing, and moisture resistance."

Their synthesis is based on methyl pyruvate + pyrrolidone + acid....I must admit that this is easier than my scheme 1.

Below is another reference to this idea.

SCHEME 1



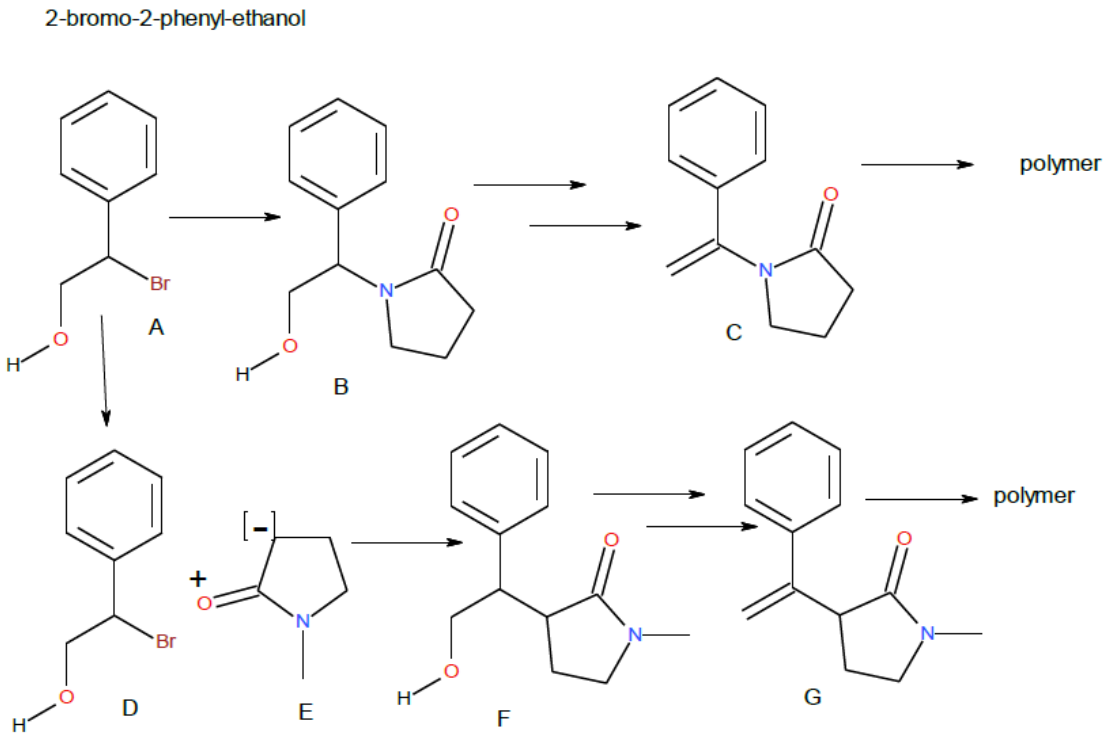
(10) **Patent No.: US 6,686,477 B2**

(45) **Date of Patent: Feb. 3, 2004**

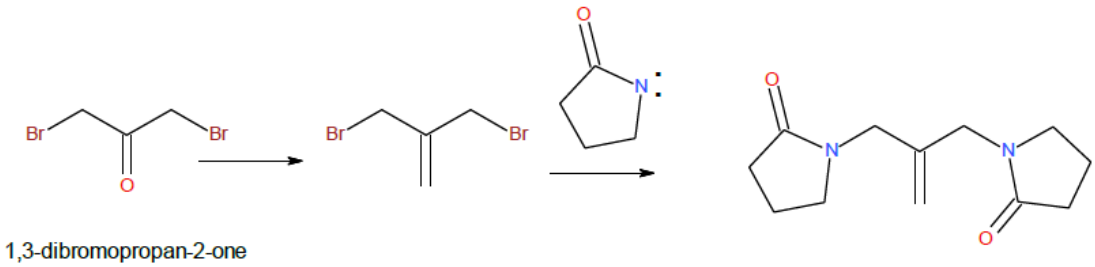
HIGHLY ENANTIOMERICALLY PURE LACTAM-SUBSTITUTED PROPANOIC ACID DERIVATIVES AND METHODS OF MAKING AND USING SAME

SUMMARY OF THE INVENTION

The present invention relates to highly enantiomerically pure lactam-substituted propanoic acid derivatives and methods of making and using therefor. The invention involves a multi-step synthesis to produce the lactam compounds. In one step of the reaction sequence, asymmetric hydrogenation of a lactam-enamide was performed to produce an intermediate that can ultimately be converted to a series of pharmaceutical compounds. The invention also contemplates the in situ synthesis of an intermediate of the multi-step synthesis, which provides economic advantages to the overall synthesis of the lactam compounds.



Scheme 2: The same idea but now with a styrene derivative. This monomer could also be synthesized with methyl pyruvate. Many styrene (benzene substituted) derivatives could also be considered.

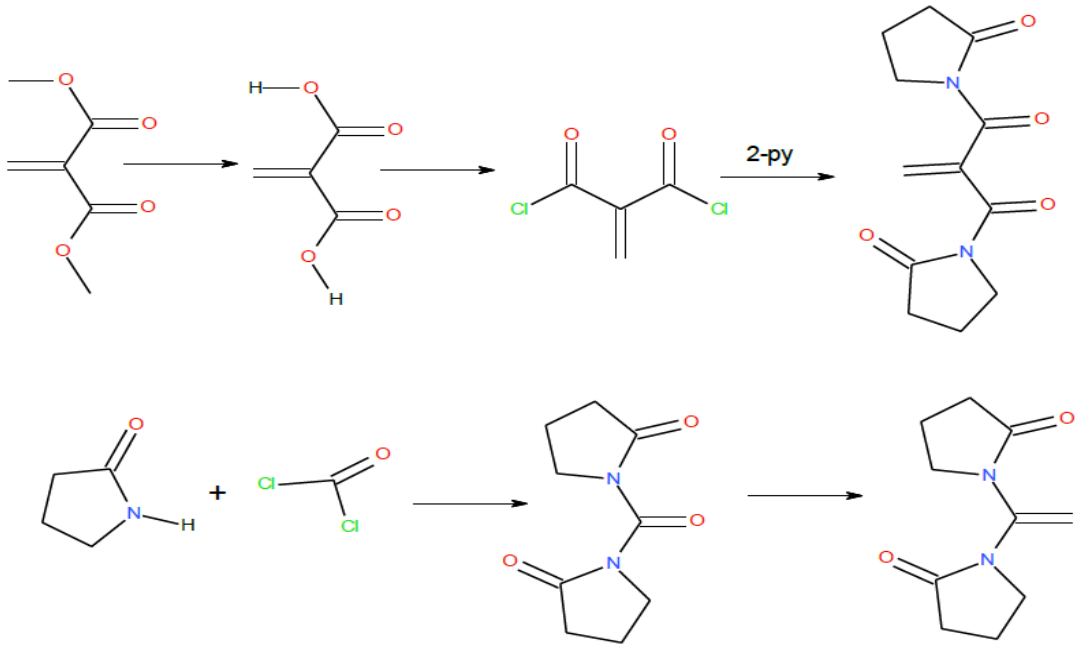


Scheme 3: 2-py could react with the dibromo-ketone which could then be converted to the methylene. Also the 2-py 3 position can have a negative charge and add at that lactam position.

So far I have not found any references to the above idea. If possible it would form unique water soluble polymers that would dry-down leading to interaction of the pyrrolidones forming tough films. It might also act as a super glue. Films formed by this polymer might be mild super skin or strong hair adhesives that can be washed off after use.

My interest in polymeric pyrrolidones is because PVP is of significant importance in

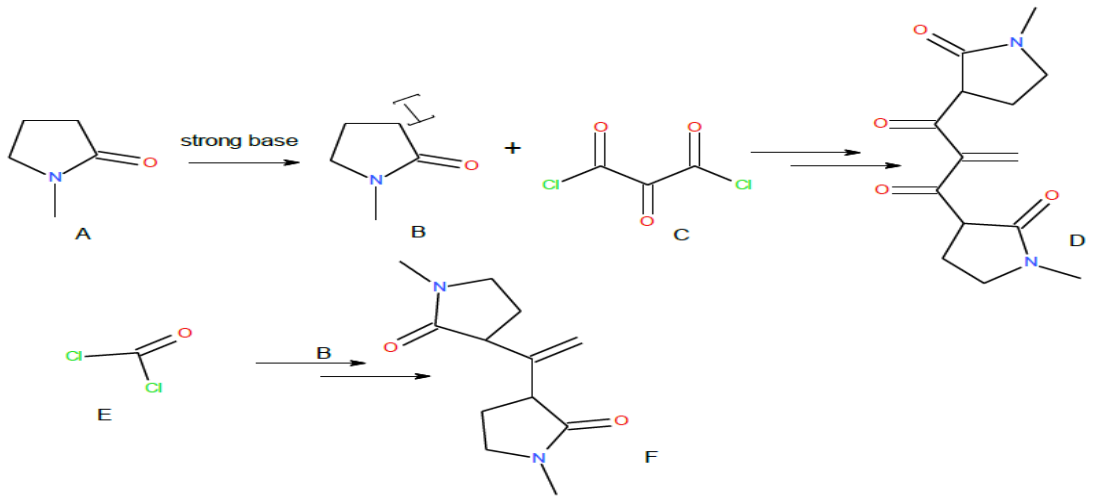
pharmaceutical and cosmetic formulations. Many copolymers of VP are known but the above monomers may have properties that suggest unique applications such as improved skin adhesives, superior hair care fixative formulations, based on strong 2-py to 2-py associated "crosslinked" films and superior ability to complex large anions.



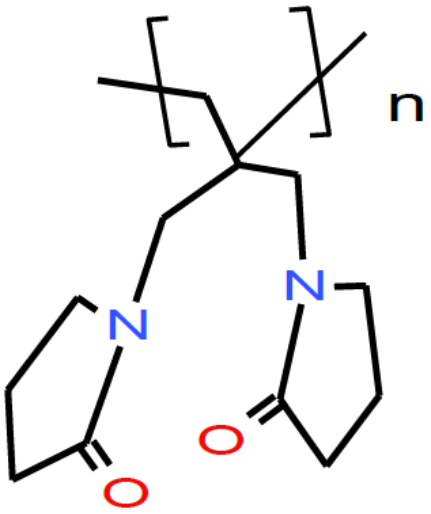
Scheme 4: In addition to scheme 3, other 2-py containing synthesis ideas are shown above. I have a problem with using phosgene in the above as it is very poisonous and I'm looking for alternatives even though this very reaction is in a patent.

"A reactor vessel was charged with 56.5 grams of (0.5 mole) caprolactam, 71.7 ml. triethylamine, and 400 ml. benzene. Twenty-four grams of phosgene was bubbled into the reaction admixture for 20 minutes at a temperature of from 25 to 35°C. The admixture was stirred for 3 hours at a temperature of from 40-60C, filtered, and the product containing filtrate was washed twice with 100 m water and evaporated yielding a mixture of semiviscous liquid and crystals. Recrystallization of the product with isopropoinol resulted in 33.2 grams of product (carbonyl bis-capro-lactam). The product was utilized as an initiator in the following lactam polyol acyl polylactam formation."

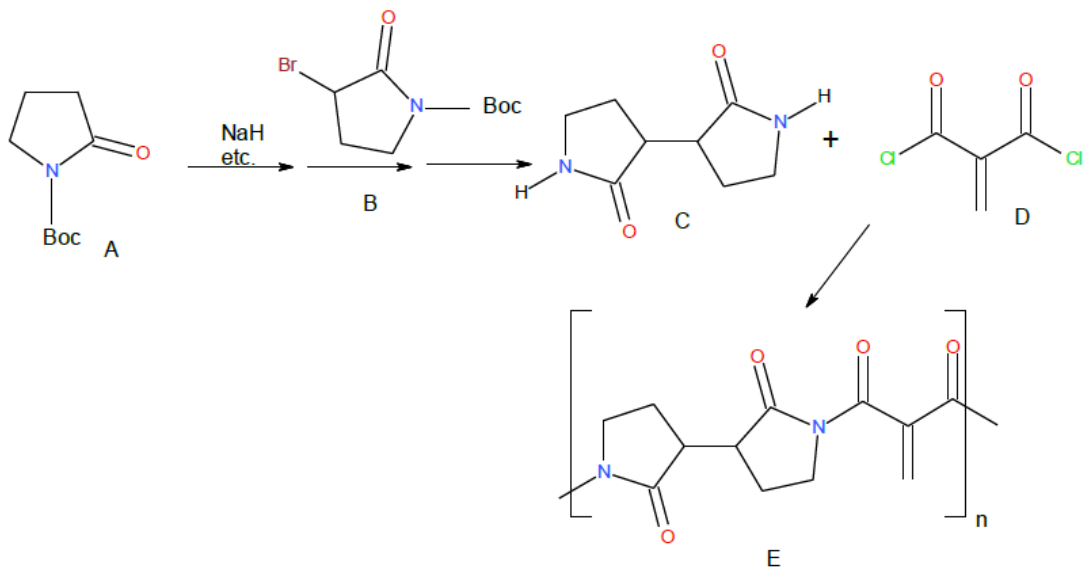
USP 3,862,262
LACTAM-POLYOL-ACYL POLYACTAM TERPOLYMERS Inventors: Ross Melvin Hendrick, Creve Coeur; James D. Gabbert, St. Louis, both of Mo. Assignee: Monsanto Company, St. Louis, Mo.



Scheme 5: Alternative way to attach pyrrolidones. These might have superior complexing ability because the amide is more exposed and free to exhibit both resonance structures.



Scheme 5: The pyrrolidones, if complexing a compound or molecule between them could they take this orientation? This is the unique possibilities for pyrrolidone/pyrrolidone interactions either intra or intermolecular. This could enhance complexing or film formation or adherence to surfaces like skin and hair.



Scheme 6: D without the methylene group the polymer would result in a water soluble polyamide with the methylene, a water soluble polyamide that could cure by FR polymerization to a highly crosslinked structure, a hydrogel.

http://rloginconsulting.com dimerspyrromethanes.pdf
Please look at my other ideas for pyrrolidone dimers in the above reference available on my web site.

Thank you,
Dr. Robert B. Login rloginconsulting.com