

TETRASUBSTITUTED PORPHYRINS SYNTHESIZED BY MECHANOCHEMISTRY.

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The four-fold acid-catalysed condensation of aldehyde and pyrrole building blocks to yield a tetra-substituted porphyrin has been found to be possible through mechanochemistry techniques, in the absence of solvent. Specifically, we have found that, upon grinding equimolar amounts of pyrrole and benzaldehyde in presence of an acid catalyst, cyclization takes place to give the porphine which, upon oxidation forms tetraphenylporphyrin (TPP) in significant yield. Mass spectrometry of the reaction mixture also shows evidence for the presence of expanded macrocycles, corresponding to the pentaphyrin, hexaphyrin, heptaphyrin and octaphyrin. We will also present results involving substituted benzaldehyde building blocks, which give rise to a family of tetrasubstituted porphyrins in the solid state. These results hold promise for the development of mechanochemical synthetic protocols for synthesis of porphyrins and related classes of compounds.