Statistical aspects of random mosaics have not been heretofore given enough attention. This thesis deals with the derivation of estimators and statistical tests in a three-dimensional Poisson-Voronoi mosaic model. The first chapter compiles elementary results in the fields of point processes, random closed sets and particle processes. These are used in a second chapter to deduce geometric properties of random mosaics. The third chapter introduces the statistical research itself, estimators and model tests. Horvitz-Thompson estimator is introduced in order to correct statistics calculated on a reduced sample. Own results are tried in a computer simulation and compared to existing research in the last chapter. Mainly, the quality of estimators and the power of proposed tests is observed.