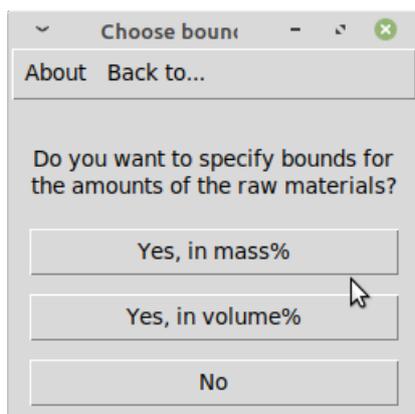
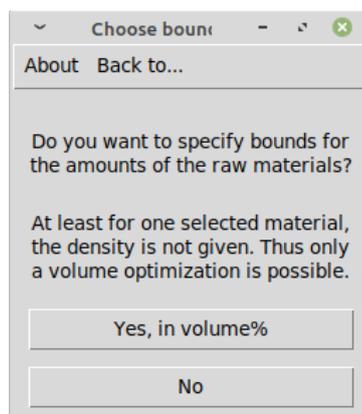


## Definition of bounds for the batch composition

Depending on the saved properties of the selected raw materials—namely if the true density for all chosen materials is given—the batch bounds can be defined either in vol% and wt% or only in vol%. The software checks this circumstance beforehand (cf. Figure 1). Moreover, there is a shortcut if no bounds are to be defined: In this case automatically all lower bounds are set to 0% and all upper bounds to 100% defining the co-domains for the contents.



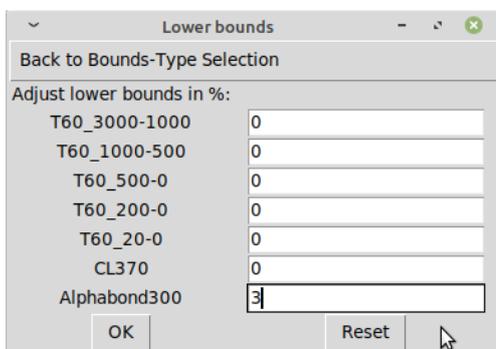
(a) Window in case of given densities



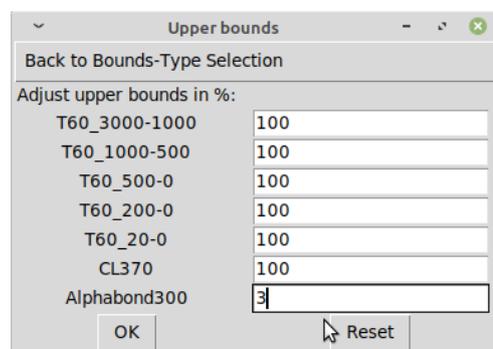
(b) Window in case not all densities are saved

Figure 1: Different dialogs depending on whether true densities are given for all raw materials

The reason that calculations in wt% (including batches and their bounds in wt%) are only possible if the true densities for the raw materials are given is that the particle size distributions saved in the database or recipe files are in vol% and furthermore are considered to be of a true density independent on the particle size for the single raw materials. A composition by volume is thus always possible, but the weight fractions differ by the respective densities. Hence, to calculate in wt%, the true densities for all raw materials to be included in the batch are required. If not given during adding a raw material to a database, the true density can always be added by using the 'Edit material in an existent database' function accessible from the Main window menu of the ParSD software.



(a) Lower bounds



(b) Upper bounds

Figure 2: Input bounds

After choosing a bounds type of either vol% or wt%, the bounds are inputted (Figure 2). The predefined values are 0 for the lower and 100 for the upper bounds. It is possible to adjust lower and upper bounds to the same value which means that this raw material is to be contained with a constant amount. For example, a user might want to fix the content of a special additive or of two components giving a reaction bond. The software only checks that not all materials were fully defined meaning that for all materials equal lower and upper bounds were given (Figure 3) which would equal a batch definition and would lead to errors in the further calculations. Caution: In the present version of the software it is not checked, if the lower bounds are lower or equal to the upper bounds which is mandatory.

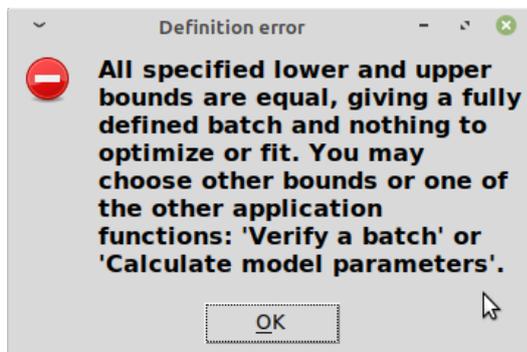


Figure 3: Error message if the batch was fully defined