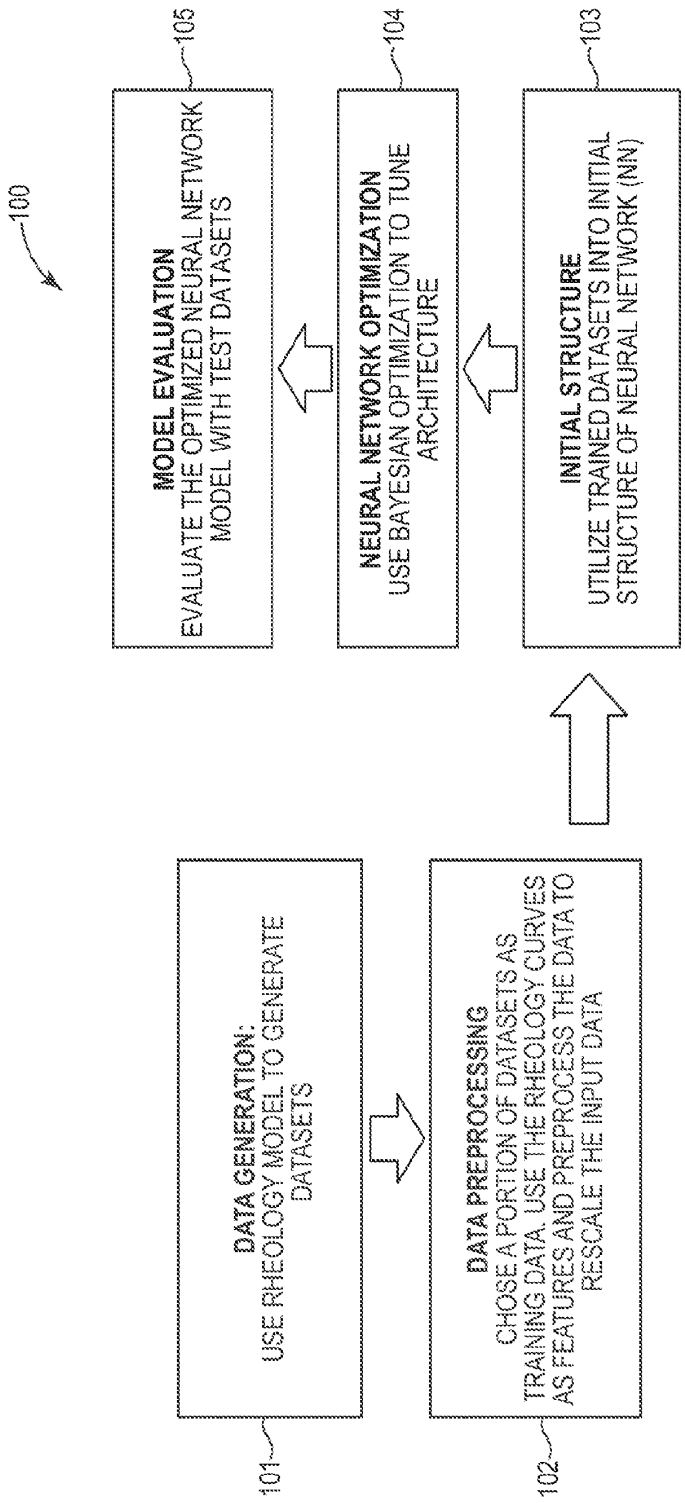
100
101
DATA GENERATION:
USE RHEOLOGY MODEL TO GENERATE DATASETS
102
DATA PREPROCESSING
CHOSE A PORTION OF DATASETS AS TRAINING DATA. USE THE RHEOLOGY CURVES AS FEATURES AND PREPROCESS THE DATA TO RESCALE THE INPUT DATA
103
INITIAL STRUCTURE
UTILIZE TRAINED DATASETS INTO INITIAL STRUCTURE OF NEURAL NETWORK (NN)
104
NEURAL NETWORK OPTIMIZATION
USE BAYESIAN OPTIMIZATION TO TUNE ARCHITECTURE
105
MODEL EVALUATION
EVALUATE THE OPTIMIZED NEURAL NETWORK MODEL WITH TEST DATASETS

Fig. 1

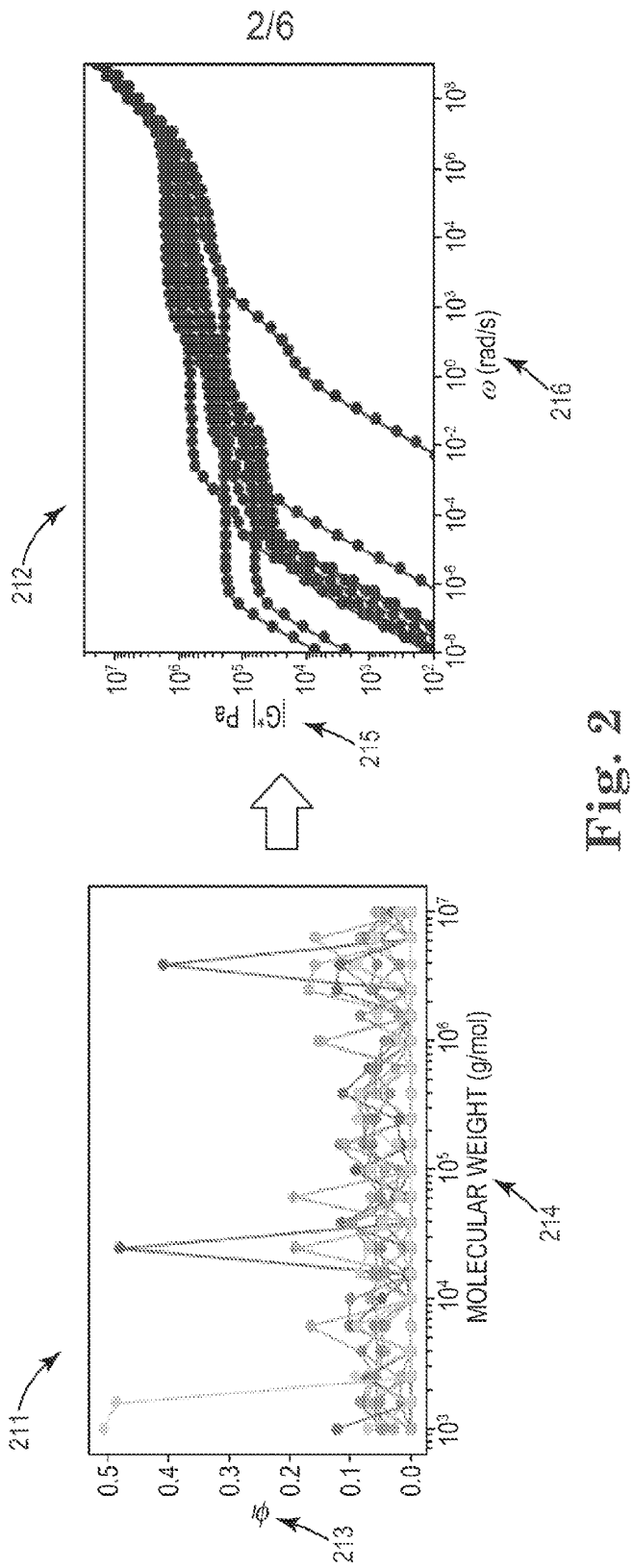

Fig. 2

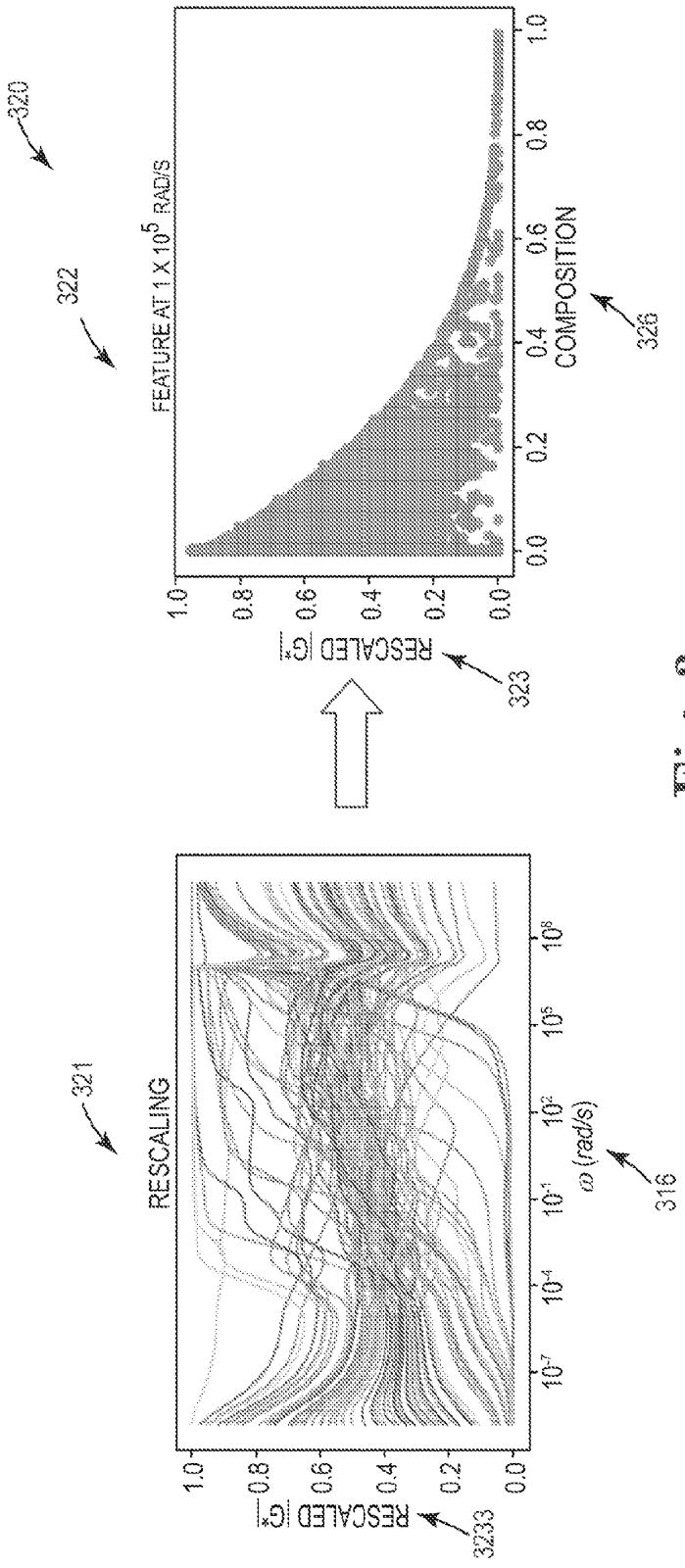
320
322
FEATURE AT 1 X 10^5 RAD/S
COMPOSITION
326
RESCALED |G*|
323
321
RESCALING
ω (rad/s)
316
RESCALED |G*|
3233

Fig. 3

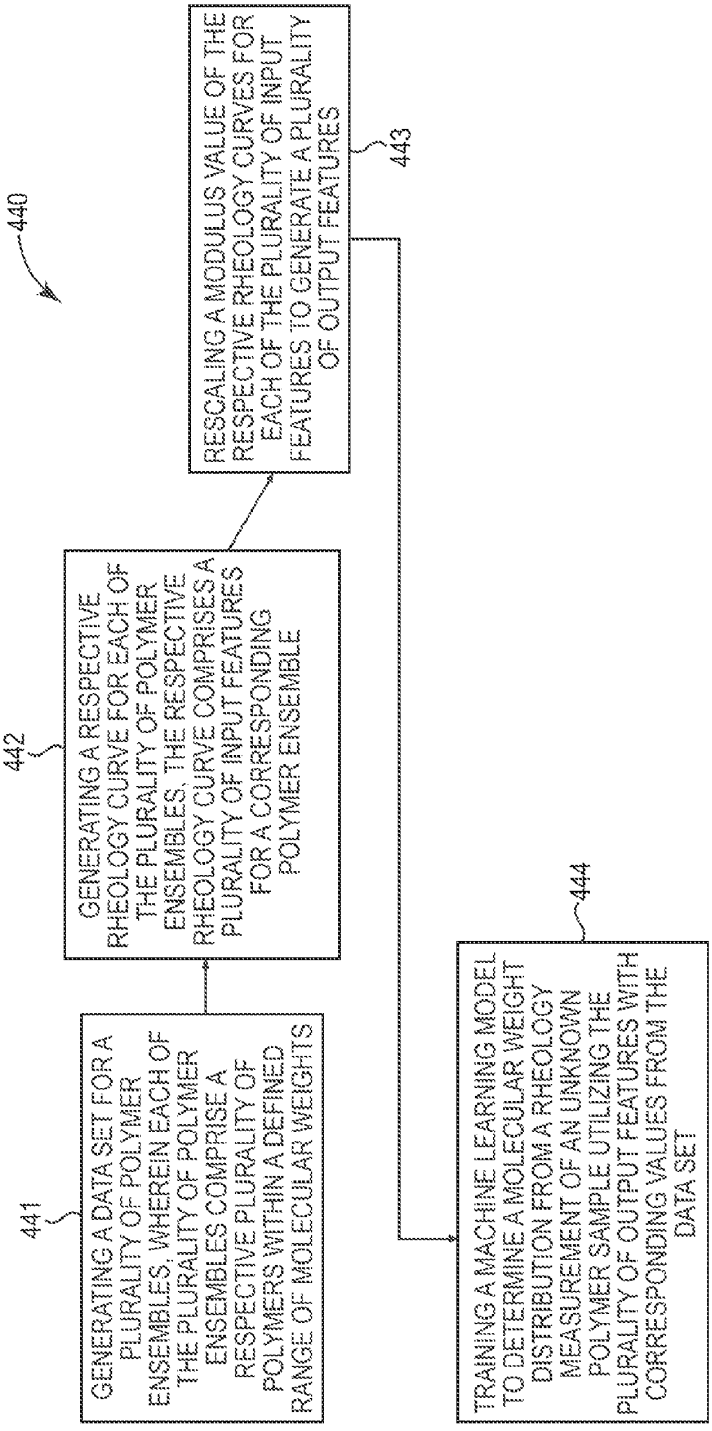
440
441
GENERATING A DATA SET FOR A PLURALITY OF POLYMER ENSEMBLES, WHEREIN EACH OF THE PLURALITY OF POLYMER ENSEMBLES COMPRISE A RESPECTIVE PLURALITY OF POLYMERS WITHIN A DEFINED RANGE OF MOLECULAR WEIGHTS
442
GENERATING A RESPECTIVE RHEOLOGY CURVE FOR EACH OF THE PLURALITY OF POLYMER ENSEMBLES, THE RESPECTIVE RHEOLOGY CURVE COMPRISES A PLURALITY OF INPUT FEATURES FOR A CORRESPONDING POLYMER ENSEMBLE
443
RESCALING A MODULUS VALUE OF THE RESPECTIVE RHEOLOGY CURVES FOR EACH OF THE PLURALITY OF INPUT FEATURES TO GENERATE A PLURALITY OF OUTPUT FEATURES
444
TRAINING A MACHINE LEARNING MODEL TO DETERMINE A MOLECULAR WEIGHT DISTRIBUTION FROM A RHEOLOGY MEASUREMENT OF AN UNKNOWN POLYMER SAMPLE UTILIZING THE PLURALITY OF OUTPUT FEATURES WITH CORRESPONDING VALUES FROM THE DATA SET

Fig. 4

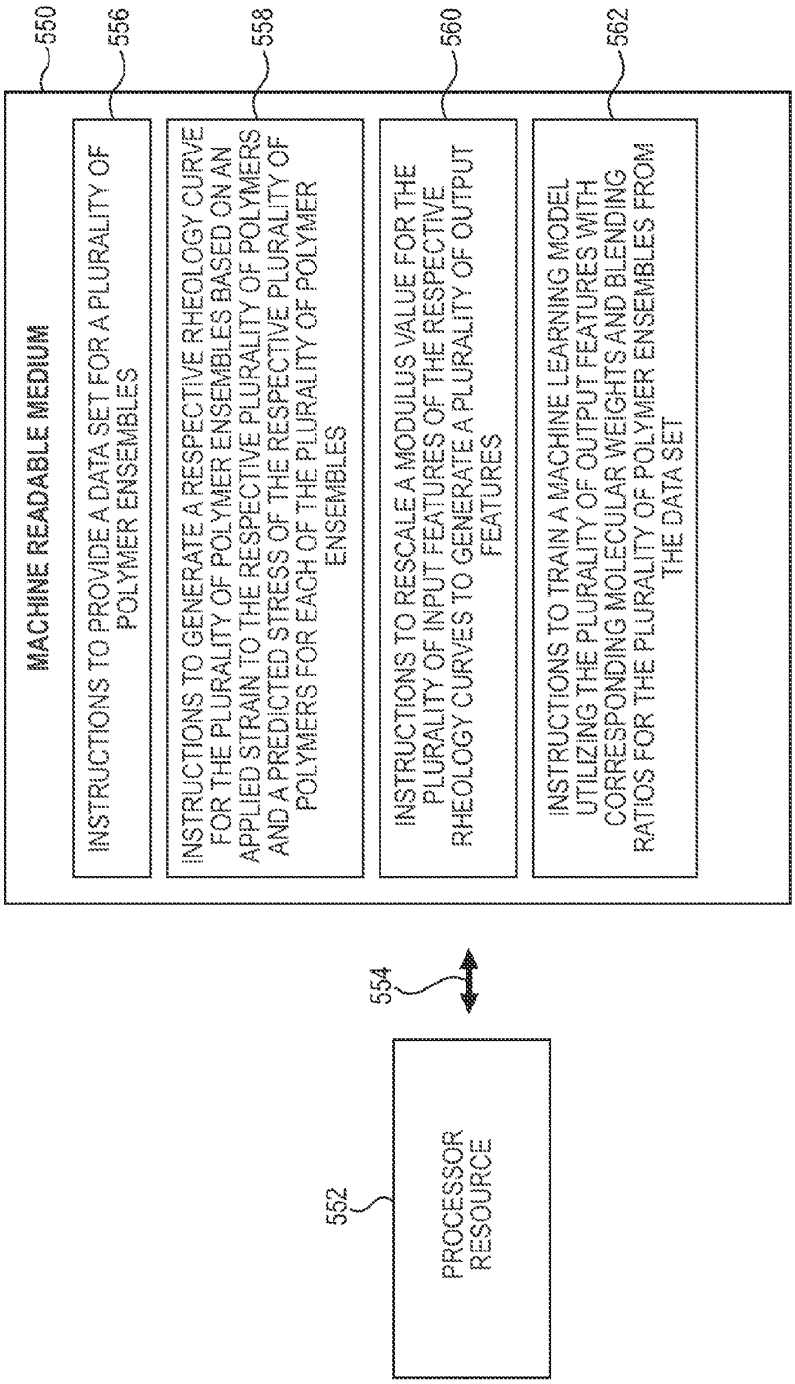
550
556
558
560
562
MACHINE READABLE MEDIUM
INSTRUCTIONS TO PROVIDE A DATA SET FOR A PLURALITY OF POLYMER ENSEMBLES
INSTRUCTIONS TO GENERATE A RESPECTIVE RHEOLOGY CURVE FOR THE PLURALITY OF POLYMER ENSEMBLES BASED ON AN APPLIED STRAIN TO THE RESPECTIVE PLURALITY OF POLYMERS AND A PREDICTED STRESS OF THE RESPECTIVE PLURALITY OF POLYMERS FOR EACH OF THE PLURALITY OF POLYMER ENSEMBLES
INSTRUCTIONS TO RESCALE A MODULUS VALUE FOR THE PLURALITY OF INPUT FEATURES OF THE RESPECTIVE RHEOLOGY CURVES TO GENERATE A PLURALITY OF OUTPUT FEATURES
INSTRUCTIONS TO TRAIN A MACHINE LEARNING MODEL UTILIZING THE PLURALITY OF OUTPUT FEATURES WITH CORRESPONDING MOLECULAR WEIGHTS AND BLENDING RATIOS FOR THE PLURALITY OF POLYMER ENSEMBLES FROM THE DATA SET
554
552
PROCESSOR RESOURCE

Fig. 5

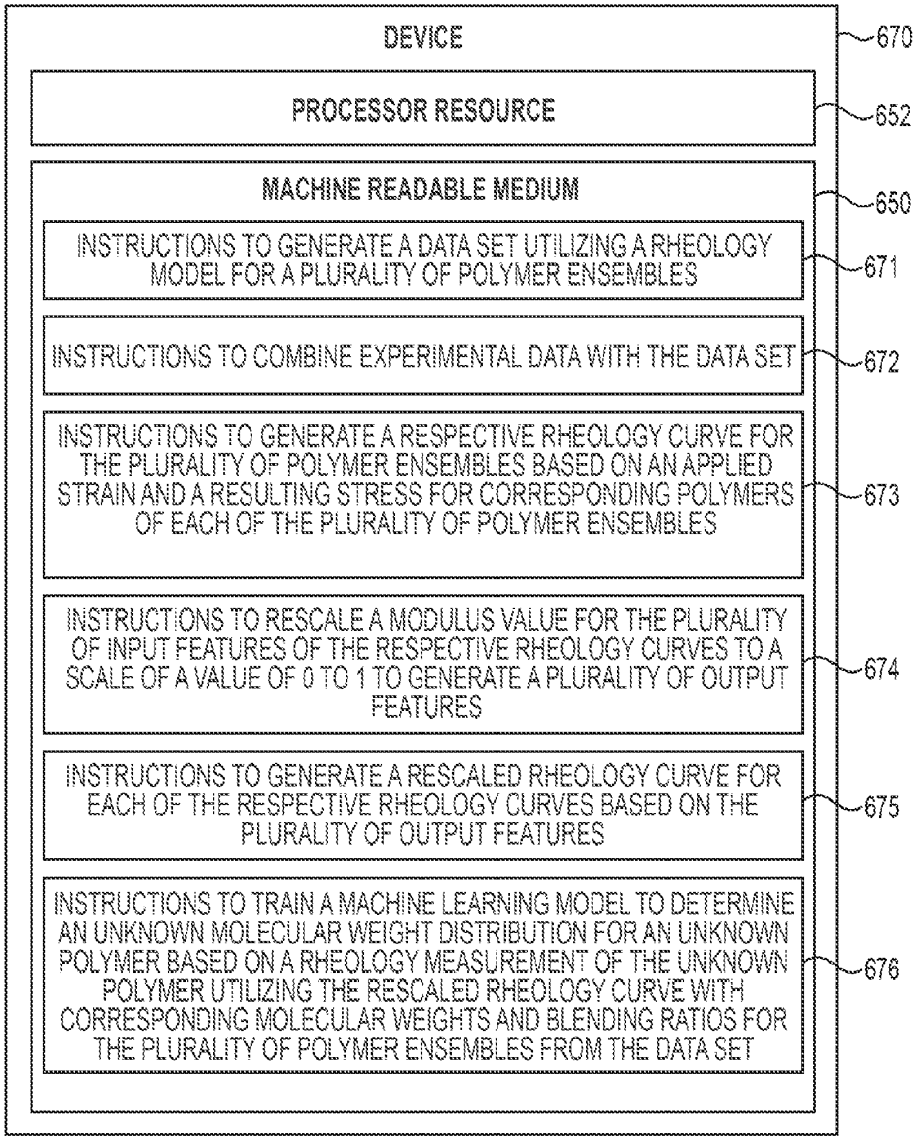
DEVICE
670
PROCESSOR RESOURCE
652
MACHINE READABLE MEDIUM
650
INSTRUCTIONS TO GENERATE A DATA SET UTILIZING A RHEOLOGY MODEL FOR A PLURALITY OF POLYMER ENSEMBLES
671
INSTRUCTIONS TO COMBINE EXPERIMENTAL DATA WITH THE DATA SET
672
INSTRUCTIONS TO GENERATE A RESPECTIVE RHEOLOGY CURVE FOR THE PLURALITY OF POLYMER ENSEMBLES BASED ON AN APPLIED STRAIN AND A RESULTING STRESS FOR CORRESPONDING POLYMERS OF EACH OF THE PLURALITY OF POLYMER ENSEMBLES
673
INSTRUCTIONS TO RESCALE A MODULUS VALUE FOR THE PLURALITY OF INPUT FEATURES OF THE RESPECTIVE RHEOLOGY CURVES TO A SCALE OF A VALUE OF 0 TO 1 TO GENERATE A PLURALITY OF OUTPUT FEATURES
674
INSTRUCTIONS TO GENERATE A RESCALED RHEOLOGY CURVE FOR EACH OF THE RESPECTIVE RHEOLOGY CURVES BASED ON THE PLURALITY OF OUTPUT FEATURES
675
INSTRUCTIONS TO TRAIN A MACHINE LEARNING MODEL TO DETERMINE AN UNKNOWN MOLECULAR WEIGHT DISTRIBUTION FOR AN UNKNOWN POLYMER BASED ON A RHEOLOGY MEASUREMENT OF THE UNKNOWN POLYMER UTILIZING THE RESCALED RHEOLOGY CURVE WITH CORRESPONDING MOLECULAR WEIGHTS AND BLENDING RATIOS FOR THE PLURALITY OF POLYMER ENSEMBLES FROM THE DATA SET
676

Fig. 6