separation zone for increasing entrained catalyst retention. The catalyst regenerator can preferably include a regeneration zone into which a regeneration medium and an at least partially coked catalyst from a reactor can be fed. The regeneration zone typically has a first lower end, a first upper end, and a first major length therebetween. The catalyst regenerator also typically includes a separation zone provided to separate entrained catalyst from gaseous components, *e.g.*, combustion products of a regeneration process, and to return the entrained catalyst to the regeneration zone. The separation zone typically has a second lower end, a second upper end, and a second major length therebetween. The separation zone can include a swaged region adjacent the second lower end of the separation zone, and the second lower end can advantageously be in fluid communication with the first upper end. The catalyst regenerator also typically includes a catalyst return into which regenerated catalyst can be fed from the regeneration zone and from which the regenerated catalyst can be directed to the reactor. According to one embodiment, the ratio of the second major length to the first major length can be greater than 1.0, greater than 1.25, greater than 1.5, greater than 2.0, greater than 3.0, greater than 4.0 or greater than 5.0. Where indicated herein, these ratios are exclusive of the swaged region. If not so indicated, then these ratios are inclusive of the swaged region, which will be factored into the second major length. By providing a catalyst regenerator having these characteristics, desirable regeneration characteristics that minimize entrained catalyst loss can be achieved, as disclosed, for example, in U.S. Patent Application Publication No. 2005-0043577 A1, the entire disclosure of which is fully incorporated by reference herein.

[0045] In an embodiment, the separation zone can advantageously include a swaged region and an upper separation region. The swaged region can typically include a narrow end and a broad end and can increase in lateral cross-sectional area from the narrow end to the broad end. The narrow end is generally oriented at the proximal end of the swaged region, while the broad end is generally oriented adjacent the distal end of the swaged region. The broad end of the

[0061] Other non-limiting examples of zeolitic and non-zeolitic molecular sieves include one or a combination of the following: Beta (U.S. Patent No. 3,308,069), ZSM-5 (U.S. Patent Nos. 3,702,886, 4,797,267 and 5,783,321), ZSM-11 (U.S. Patent No. 3,709,979), ZSM-12 (U.S. Patent No. 3,832,449), ZSM-12 and ZSM-38 (U.S. Patent No. 3,948,758), ZSM-22 (U.S. Patent No. 5,336,478), ZSM-23 (U.S. Patent No. 4,076,842), ZSM-34 (U.S. Patent No. 4,086,186), ZSM-35 (U.S. Patent No. 4,016,245, ZSM-48 (U.S. Patent No. 4,397,827), ZSM-58 (U.S. Patent No. 4,698,217), MCM-1 (U.S. Patent No. 4,639,358), MCM-2 (U.S. Patent No. 4,673,559), MCM-3 (U.S. Patent No. 4,632,811), MCM-4 (U.S. Patent No. 4,664,897), MCM-5 (U.S. Patent No. 4,639,357), MCM-9 (U.S. Patent No. 4,880,611), MCM-10 (U.S. Patent No. 4,623,527), MCM-14 (U.S. Patent No. 4,619,818), MCM-22 (U.S. Patent No. 4,954,325), MCM-41 (U.S. Patent No. 5,098,684), M-41S (U.S. Patent No. 5,102,643), MCM-48 (U.S. Patent No. 5,198,203), MCM-49 (U.S. Patent No. 5,236,575), MCM-56 (U.S. Patent No. 5,362,697), ALPO-11 (U.S. Patent No. 4,310,440), titanium aluminosilicates (TASOs) such as TASO-45 (European Patent No. EP-A-0 229 295), boron silicates (U.S. Patent No. 4,254,297), titanium aluminophosphates (TAPOs) (U.S. Patent No. 4,500,651), mixtures of ZSM-5 and ZSM-11 (U.S. Patent No. 4,229,424), ECR-18 (U.S. Patent No. 5,278,345), SAPO-34 bound ALPO-5 (U.S. Patent No. 5,972,203), those disclosed in International Publication No. WO 98/57743 published Dec. 23, 1988 (molecular sieve and Fischer-Tropsch), those disclosed in U.S. Patent No. 6,300,535 (MFI-bound zeolites), mesoporous molecular sieves (U.S. Patent Nos. 6,284,696, 5,098,684, 5,102,643 and 5,108,725), and the like, and intergrowths and/or combinations thereof. The entire disclosure of each of the references in this paragraph is hereby fully incorporated by reference herein.

[0062] In an embodiment, the molecular sieve is an intergrowth material having two or more distinct crystalline phases within one molecular sieve composition, such as a molecular sieve composition containing SAPO-18, which has an AEI framework-type, and SAPO-34, which has a CHA framework-type.

[0091] FIG. 7 depicts how, in an embodiment, the periodic addition of Pt contributed to steady state operation of a pilot plant regenerator with a controlled CO level. The pilot plant data was obtained by operating a regenerator in conjunction with an oxygenate to olefin process. The regenerator was operated at 1150°F and a pressure of 25 psig (275 kPaa), with an excess of 2.5% O_2 in the regenerator flue gas. The coke level on the regenerated catalyst was maintained at 0.5% coke by weight relative to the catalyst weight. In FIG. 7, a Pt add rate of 0.33 wppm Pt per total weight of unit catalyst inventory per day resulted in steady state operation for 5 days with a CO level below 100 wppm. Similarly, a Pt add rate of 0.15 wppm Pt per total weight of unit catalyst inventory per day produced steady state operation for 11 days with a CO level below 1000 wppm.

[0092] FIG. 8 depicts the predicted change in the amount of Pt that needs to be added to achieve a desired level of CO output in the flue gas based on the attrition resistance of the particle containing the Pt. In FIG. 8, the separate additive particle used in the examples for FIG. 7 is compared with SAPO particles as the carriers for the Pt. As shown in FIG. 8, the rate of Pt addition to achieve the same level of CO in the regenerator flue gas is reduced by a factor of roughly 5 when using the harder, SAPO particle carrier.

[0093] The principles and modes of operation of this invention have been described above with reference to various exemplary and preferred embodiments. As understood by those of skill in the art, the overall invention, as defined by the claims, encompasses other preferred embodiments not specifically enumerated herein.

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[93] The principles and modes of operation of this invention have been described above with reference to various exemplary and preferred embodiments. As understood by those of skill in the art, the overall invention, as defined by the claims, encompasses other preferred embodiments not specifically enumerated herein.

[94] For the avoidance of doubt, the term *'CO oxidation metal'* used herein, indicates that the metal functions as a CO oxidation metal catalyst and does not participate in the oxidation as a reactant.