Crushing Cubic Candy!

When a solid object dissolves, it does so only on its surface. The dissolved material usually moves away from the object leaving a fresh surface behind. This fresh surface then begins dissolving as well, and the process repeats. So the speed at which something can completely dissolve depends on how much of it there is, and on how much surface area it originally had.

Tessa did an experiment with hard candy. She discovered that crushing the candy made it dissolve faster. Let's assume she started with a single cube of candy 1 cm on a side. Let's also assume that she crushed this piece of candy until it consisted of many equally-sized cubes, each 0.5 mm on a side. Finally, let's assume she hasn't lost any small pieces in the process, so she has the same mass of candy that she started with. This also means that the total volume of the crushed candy is the same as the original large cube! But the total surface area has increased!

Compared to the original surface area of the large cube, how many times bigger is the total surface area of the crushed candy pieces?